

band of spots somewhat broken and directed inwards at the fifth spot from the costa, a submarginal band of lunules, marginal linear spots and black anteciliary fine line. *Hindwing* with a basal chain of spots, another closing the cell, and a discal much curved and broken band; marginal markings as on the forewing, but with a prominent subanal black spot between the first and second median nervules, crowned with an orange lunule, and marked outwardly with a few metallic-green scales; two minute similar spots at the anal angle."

"Mr. de Roepstorff has sent a single specimen which seems to be identical with Felder's *L.* [= *N.*] *nora*. It is allied to *N. ardates*, Moore, but differs in the discal chain of spots on the underside of the forewing being larger and less broken, also in the straighter outer margin of that wing." (*de Nicéville*, l. c.)

The specimen above referred to is still unique in the collection of the Indian Museum, Calcutta. It agrees minutely with the description of *L. felderi*, Murray, and I have no doubt that Semper was quite right in placing that species as a synonym of *N. nora*. It is by no means unlikely that *N. viola*, Moore, will have to be added to the synonymy of *N. nora*, as it is highly probable that my Andaman female of *N. nora* is the opposite sex of my two male examples of *N. viola* from the same locality; for beyond the usual sexual differences observed in this genus, there is only the colour of the ground on the underside by which to distinguish between them, and this latter is a most variable character in some species of this genus, as I have pointed out under the description of *N. ardates*, Moore.

724. *Nacaduba noreia*, Felder.

Lycarna noreia, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xviii, p. 282 (1858).

HABITAT: Ceylon.

EXPANSE: Not given.

DESCRIPTION: "FEMALE. A geographical form of *L.* [= *N.*] *nora*, Felder, but with the external margin less convex in the forewing. *UPPERSIDE*, both wings brownish-fuscous. *Forewing* with the interno-basal patch subtriangular. *Hindwing*, with the basal patch violaceous-blue, the marginal spots more obscure, the usual extra-caudal one excepted, very obsolete. *UNDERSIDE*, both wings hoary-fuscescent, a disco-cellular spot (in the hindwing rather narrow), a chain-shaped fascia beyond the middle once broken, with an antico-basal fasciole on the forewing, not going beyond the median nervure, and a basal fascia on the hindwing composed of four spots and within it an anterior incomplete spot, fuscous, circled with whitish, filled up with the ground-colour, with somewhat fuscous marginal spots (in the hindwing more triangular), the extra caudal one larger, and the minute black anal pair on the hindwing excepted, circled with whitish, set upon concolorous spots lunate in the forewing and sagittate in the hindwing, with a fuscous marginal line, and a whitish line before the cilia cut through by fuscous spots at the tips of the veins." (*Felder*, l. c.)

N. noreia appears never to have been recognised since it was first described, and is not included by Mr. Moore in his "Lepidoptera of Ceylon." It is said to have the exterior margin of the forewing less convex than in *N. nora*, Felder, in which case it must indeed have a straight outer margin; then, on the underside of the forewing, the antico-basal fasciole is said not to extend beyond the median nervule; no species of the genus known to me presents this feature, except *N. bhutes* and *N. hamptonii*, mihi. The type specimen is said to have been taken at Niuera Ellia, at about 6,000 feet, on 24th December, 1864.

725. *Nacaduba atrata*, Horsfield.

Lycarna atratus, Horsfield, Cat. Lep. E. I. Co., p. 78, n. 13 (1828); *Nacaduba atrata*, Moore, Lep. Cey., vol. i, p. 89 (1881); *id.*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. iv, pt. 2, p. 366, n. 121 (1886); *Lycarna atrata*, Moore, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 22, n. 20 (1857).

HABITAT: JAYA (*Horsfield*), Malda, Sikkim, Assam, Bhutan, Cachar, Ootacamund, Ceylon, Malay Peninsula.

EXPANSE: ♂, 1.2 to 1.5; ♀, 1.25 to 1.30 inches.

DESCRIPTION: "FEMALE. *UPPERSIDE*, both wings shaded with violet-blue from the base towards the margin, on a brownish ground transmitting a white patch on the disc. *Forewing*

with the exterior and posterior margins dark blackish-brown. *Hindwing* along the posterior margin marked with a series of oblong brown spots, enclosed by two undulated white threads, the interior one being bounded by a deep brown fascia, and the exterior one by a blackish margin fringed with grayish-brown. *UNDERSIDE*, both wings brown, with a shade of silvery gray; with three white marginal strigæ extending uniformly through both wings. *Forewing* with six white strigæ following each other, after nearly equal intervals, from a small vacancy at the base to the marginal series; they do not arise in contact with the costa, but a small intervening space is occupied by four marginal dots, in irregular succession, of which the two posterior ones are most distinct; the first three interior strigæ are parallel and nearly regularly transverse; the fourth is very short; the fifth extends across the surface with a slight obliquity inwards; the sixth terminates in the middle of the surface. *Hindwing* with seven transverse strigæ occupying the whole surface to the marginal series; the basal one is short and obscure, the remaining are broken, and a short lineola is placed, in some cases, immediately between the successive strigæ; they have a very slight curve towards the anterior margin: there are three anal ocelli, agreeing in character with those of *L. [= N.] pavana*, Horsfield [from Java]; one exterior, near the margin large and regularly orbicular; the next reniform, with a more saturated tint at the lobe which touches the interior ocellus situated at the extreme anal angle, and more pronounced than in the allied species [*N. pavana*]; the two anterior ocelli are connected by a short streak of silvery microrations covering their inner border and bounded by a short rufous fascia. *Antennæ* and *abdomen* obscurely banded with white, the *thorax* and *body* are anteriorly covered with gray hair. (Horsfield, l. c.) **MALE.** *UPPERSIDE*, both wings plumbeous-purple, with a narrow outer black margin. *UNDERSIDE*, both wings as in the female.

"Closely allied to *N. prominens*, Moore, but comparatively smaller in size. **MALE.** *UPPERSIDE*, both wings of a uniformly darker grey-blue. *UNDERSIDE*, both wings with the white bands more distinct, the marginal band encloses a series of black spots, and the sub-marginal band is more acutely sinuous with black interspaces. **FEMALE.** *UPPERSIDE*, both wings of a more intense and darker glistening blue, the brown outer borders broader." *UNDERSIDE*, both wings as in the male. (Moore, l. c. in Lep. Cey.)

Unfortunately Mr. Moore does not figure this species in his "Lepidoptera of Ceylon." From his description of it, it appears to have the white bands of the underside more distinct than in *N. prominens*, the marginal band enclosing a series of black spots, and the sub-marginal band more acutely sinuous with black interspaces. It is easy from these characters to pick out specimens of typical *N. atrata*, but the matter is complicated to me by the possession of one male from Ootacamund labelled by Mr. Moore *N. kurava* (this species being a synonym of *N. atrata* as stated by Mr. Moore himself), another male from Bholahat and another from Sikkim, labelled *N. atrata*, which agree in none of these characters with *N. atrata*, being in fact typical *N. prominens*. Lastly, I possess a pair of specimens from Ceylon labelled by Mr. Moore *N. prominens* which are really—following the above indicated characters—*N. atrata*. Mr. Moore may have inadvertently reversed these species in naming these specimens, though the name *prominens* would seem to refer to a species with very prominent bands, but *N. atrata* has them the more prominent of the two.

Accepting, as I must do, his descriptions in preference to his ticketed specimens, I find that I have examples before me of *N. atrata* from Bholahat in the Malda district, from Sikkim, Bhutan, Cachar, Ootacamund, Ceylon, and five male specimens from Singapore collected by Mr. W. Davison. This species is not included in Mr. Distant's "Rhopalocera Malayana."

726. *Nacaduba prominens*, Moore.

Lympides prominens, Moore, Ann and Mag of Nat. Hist, fourth series vol. xx, p. 341 (1877); *Nacaduba prominens*, id., Lep. Cey., vol. 1, p. 88, pl. xxviii, figs. 3, male; 3a, 3b, female; 3c, larva and pupa (1881).

HABITAT: Bholahat in the Malda district, Sikkim, Bhutan, Cachar, Cherrapunji, Shillong, Orissa, North Canara, Ootacamund, Shevaroy Hills, Ceylon.

EXPANSE: ♂, ♀, 1½ to 1¾ inches.

DESCRIPTION: "MALE. *UPPERSIDE*, both wings violet-blue, with very narrow indistinct brown marginal line. *UNDERSIDE*, both wings pale greyish-brown, crossed by five prominent dark-bordered white slightly-waved bands, an intermediate short band at the end of the cell, and two marginal blackish-interspaced bands, the inner one sinuous. *Hindwing* crossed by six broken white bands, two marginal blackish-interspaced sinuous bands, a large subanal and a small anal black spot, both silvery-speckled and ochreous-bordered. **FEMALE. *UPPERSIDE***, both wings paler than in the male, the basal part brilliant greyish-blue. *Forewing* with the costal border and outer margin broadly black. *Hindwing* with the costal border broadly black, and a marginal row of black spots enclosed by a lunular line." **UNDERSIDE** as in the male.

"Allied to *L. [=N.] bercei*, Felder" [from Malacca and Luzon]. (Moore, l. c. in Ann. and Mag. of Nat. Hist.)

"**LARVA** onisciform; pale rose colour, with dorsal and lateral rows of brighter spots. Feeds on the very young leaves of *Vateria indica*. **PUPA** somewhat cylindrical, head blunt; reddish, with minute black spots." (Moore, l. c. in Lep. Cey.)

Thanks to the kindness of Messrs. Fairlie and Green, I have before me, as I write, very large series of both *N. prominens* and *N. atrata* from Ceylon. Following the characteristic differences given by Mr. Moore to define these two species, I have, with great difficulty, divided them into sets, the extremes of each being sufficiently distinct, but they gradually merge into one another and at the point of junction can hardly be separated. The blue coloration of the females on the upperside is very variable, some being almost white in some lights, some a little darker in shade, others again quite purple. I think further knowledge will make it clear that *N. atrata* is a variable species, and that it includes *N. prominens* as one extreme of its variations. I possess specimens of it from Bholahât, Sikkim, Bhutan, several places in Assam, from Orissa, North Canara, the Shevaroy Hills, and Ootacamund. In seven of these places *N. atrata* also occurs, a fact which should not be overlooked.

727. *Nacaduba plumbeomicans*, W.-M. and de N.

Lamproidea plumbeomicans, Wood-Mason and de Nicéville, Journ. A. S. B., vol. xlix, pt. 2, p. 237, n. 41 (1880); *Nacaduba plumbeomicans*, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 40 (1886); *Lamproidea plumbeomicans*, var. *nicobaricus*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. l, pt. 2, p. 234, n. 35 (1887).

HABITAT: South Andaman and Nicobar Isles; Mergui; Chittagong Hill Tracts.

EXPANSE: ♂, 1.1 to 1.3; ♀, 1.16 to 1.25 inches.

DESCRIPTION: "Closely allied to *N. macrophthalma*, Felder, but much smaller; with three instead of two fasciæ on the underside of the forewing, with all the fasciæ relatively broader, and with those of the hindwing much less complexly faulted and contorted. **MALE. *UPPERSIDE***, both wings dark amethyst-purple, with a dull greyish leaden metallic lustre, with a deep black anteciliary line and fuscous cilia. **UNDERSIDE**, both wings pale fuscous of a purplish tinge, with a marginal and a submarginal fascia composed of suboval spots of a darker shade than the ground, both margined and connected by whitish, the latter of them bearing in the hindwing subanal and anal black spots in every respect as in *N. macrophthalma*, except that the luteous inner line is rather more distinct. *Forewing* with a basal fascia, a discocellular fasciole, and a discal fascia faulted as in *N. macrophthalma* at the second median nervule; with the fasciæ as also the fasciole commencing at the costal nervure where they are all broken. *Hindwing* with corresponding fasciole and fasciæ, which latter are more or less faulted at every vein though much less contorted and consequently more easily traced than in *N. macrophthalma*; fasciæ and fascioles of both wings margined on both sides with fuscous of a rather deeper shade than the ground and with whitish. **FEMALE *UPPERSIDE***, both wings dull smoky. *Forewing* with a pale discal patch which has a brilliant metallic pale bluish lustre in certain lights. *Hindwing* with a thin interrupted white line before the dark anteciliary one and a submarginal row of dark spots before it, spots and line increasing in size, breadth, and distinctness from the apical angle to the subanal region, the former obscurely encircled internally with smoky whitish. **UNDERSIDE**, both wings lighter, with all the markings more

pronounced, being margined with fuscous much darker than the ground and with pure white, and the marginal and submarginal macular fasciæ, especially conspicuous and coarse." *Wood-Mason and de Nicville*, l. c.)

N. plumbeomicans comes into quite a different group from *N. macrophthalma*, from which it is of course abundantly distinct, having an extra fascia or rather two extra strigæ to the forewing on the underside, but it is very near to Ceylon specimens of *N. prominens*, Moore, from which it differs in its slightly paler coloration on the upperside in the male, rather broader forewing, the outer margin less oblique, the inner margin longer. The markings on the underside are precisely similar, being narrow and clearly defined, the edges of the whitish fasciæ not at all blurred. The female is less variable than that sex of *N. prominens*, the metallic blue patch on the upperside of the forewing being always small, while in *N. prominens* it varies very greatly in size.

N. plumbeomicans was taken by Dr. Anderson in considerable numbers in the Mergu Archipelago during the cold weather, there is a single male specimen from the Chittagong Hill Tracts in the Indian Museum, Calcutta, and in the Andamans it appears to be a common species.

Local race *nicobaricus*. "MALE. UNDERSIDE, both wings purplish slate-colour, the marginal and submarginal macular fasciæ more distinct, iron-grey, narrower, and separated by a wider space of the ground-colour from the discal fasciæ, in having all the fasciæ more sharply defined; and in having a very much larger subanal black spot, which is more broadly encircled with brighter orange, on the hindwing, than in *N. plumbeomicans*." (*Wood-Mason and de Nicville*, l. c., Journ. A. S. B., vol. 1.)

This local race occurs on Kamorta and Katschall in the Nicobar Isles, and seems to be rare. I have only seen four specimens in all.

Two other species of this group occur in the Malay Peninsula, their descriptions will be found below.* Without specimens of them for comparison with the Indian species, it is quite impossible for me to give any distinguishing characters.

728. *Macaduba celestis*, de N. (PLATE XXVII, FIG. 184 ♂).

N. celestis, de Nicville, Journ. A. S. B., vol. 19, pt. 2, p. 366, n. 122, pl. xviii, fig. 11, male (1886). *id.*, Doherty, l. c., p. 133, n. 173.

HABITAT: Jhulaghāt, 2,000 feet, Kumaon; Sikkim, Cachar; Khasi Hills; Sibsagar, Upper Assam; South Andaman Isles.

* *Macaduba beroë*, Felder, *Lycana beroë*, Felder, Reise Novara, Lep. vol. ii, p. 275, t. 240, pl. xxiv, fig. 36, male (1865); *Lampides beroë*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 3 (1877); *Macaduba beroë*, Distant, Rhop. Malay., p. 219, n. 2, pl. xx, figs. 17, male (1884), female (1884). HABITAT: Malacca (Butler); Luzon (Felder). EXPANSE. Male and female, 1 1/2 inches. DESCRIPTION: "MALE. UPPERSIDE, both wings of a leaden-violet tint, with a black-fuscous anteciliary streak. UNDERSIDE, both wings of a pale hoary brown colour, with fuscous macular with the following fasciæ:—white, and closely touching one another along the margin of the wing. Forewing with the following fasciæ:—One subbasal almost touching the costa, then a subcostal spot, a short discal cellular fasciæ, an exterior chain-like fasciæ broken at the second median nervule. Hindwing with a basal fasciæ, a discal-cellular fasciæ, and like fasciæ broken at the second median nervule. Hindwing with a basal fasciæ, a discal-cellular fasciæ, and like fasciæ broken at the second median nervule. Anteriorly twice strongly broken, and posteriorly broken, chain-like, of the colour of the ground, [all] laterally surrounded with fuscous and margined with white; also a posterior spot, which is orbicular, inwardly girt by a yellowish circle, outwardly divided by a delicate metallic bow, it has also a pair of minute black anal spots which have inwardly a narrow border of a metallic yellowish tint."

"Near to *L. (= N.) calauria*, Felder, from Amboina. (Felder, l. c. in Reise Novara.)

"This species seems to be very closely allied to *N. atrata*, Horsfield, and so again with the equally similar form described as *N. prominens*, Moore. Horsfield's species, however, appears to be distinct by the colour pattern of the wings of the female 'transmitting a white patch on the disc.' (Distant, l. c.)

Macaduba almora, Druce, *Cupido almora*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 14, pl. xxxiv, fig. 7, male; *Lampides almora*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 5 (1877); *Macaduba almora*, Distant, Rhop. Malay., p. 220, n. 5, pl. xx, fig. 22, male (1884). HABITAT: Borneo (Druce); Malacca (Butler and Distant). EXPANSE. Male, 1 1/2 inches. DESCRIPTION: "MALE. UPPERSIDE, both wings: pale brownish-blue. Hindwing with two black spots at the anal angle, with a narrow black line round the outer margin. UNDERSIDE, both wings very pale brown, streaked and spotted with white, black spots as above." (Druce, l. c.)

This description is absolutely worthless, and till this species and others described by Mr. Druce are re-described, they will never be recognised. The figures are equally bad. On the single page where *N. almora* is described, five other "new species" are also described in from three to six lines apiece. Mr. Distant figures this species without tails.

EXPANSE: ♂, 1.00 to 1.15 inches.

DESCRIPTION: "MALE. UPPERSIDE, both wings shining bluish-purple, the outer margins somewhat widely black. Hindwing with a fine white anteciliary line from the anal angle to the first median nervule. UNDERSIDE, both wings dusky. Forewing with a subbasal straight fascia from the subcostal nervule to the inner margin darker than the ground-colour, and margined with white; a similar fascia from near the costa to the inner margin enclosing the disco-cellular nervules, and a series of five similar spots forming an outwardly-curved band from the costa to the second median nervule; a submarginal series of dusky spots outwardly narrowly and inwardly widely defined with white; an anteciliary fine white line. Hindwing with three indistinct basal spots, a subbasal straight band, another across the disc, coalescing with a shorter much curved one beyond, and enclosing a conspicuous small oblong white spot, marginal markings as in forewing, but with a round black spot beyond the origin of the tail, outwardly defined with silvery-blue scales and inwardly with an orange line, and with a few similar scales towards the anal angle. Cilia dusky, as is also the tail, the latter tipped with white" (de Nicéville, l. c.)

This species is quite unmistakable for any other known to me. It has a wide range, from Kumaon to Upper Assam, reappearing in the Andaman Isles. It is strange that out of the very numerous male specimens I have received there should be not one female; this is probably to be accounted for by the males having been captured near water, and in the open, while the females keep to the bushes and thick forest.

The figure shews both sides of a rather lightly-marked male specimen from Cachar now in the Indian Museum, Calcutta.

729. *Nacadura bhutes*, de N.

N. bhutes, de Nicéville, Journ. A. S. B., vol. III, pt. 2, p. 72, n. 10, pl. I, fig. 13, male (1883); id., Elwes, Trans. Ent. Soc. Lond., 1888, p. 387, n. 273.

HABITAT: Sikkim.

EXPANSE: ♂, 1.1 inches.

DESCRIPTION: "MALE. Differs from Sikkim specimens of *N. ardates*, Moore, in being larger, the band crossing the middle of the cell on the UNDERSIDE of the forewing in *N. ardates* not extending below it in *N. bhutes*, and the lower spot of the discal series well retired from the line of the five spots above it, whereas in *N. ardates* there are two lower spots out of line, one being additional."

"I took a single specimen on the Darjeeling cart-road between 2,000 and 5,000 feet elevation, in October, 1880, and numerous specimens have since been taken in Sikkim at low elevations. It seems a constant and well-marked species." (de Nicéville, l. c.)

"This species, though very close to *N. ardates*, may be distinguished without difficulty, if fresh specimens are compared. The best character is in the lower spots of the discal series on the forewing below, which form a bar right across the wing in *N. ardates*, and in *N. bhutes* are less in number, and do not reach the hind margin. De Nicéville says truly that the band crossing the middle of the cell on the forewing below does not extend below it in *N. bhutes*, and, though in *N. ardates* it usually does, yet I find some specimens in which this bar is variable in length."

"*N. bhutes* is not so common as *N. ardates*, and, like it, frequents wet sandy spots in the beds of rivers at 1-3,000 feet. I took it below Mongpo in June, and Moller gets it from April to October." (Elwes, l. c.)

In speaking of *N. ardates*, Moore, Mr. Butler notes on some specimens collected "near Assam" that "four damaged males were obtained, no two of them absolutely alike in the pattern on the underside of the forewing. A nearly allied 'species' described by de Nicéville, is separated from the above [*N. ardates*] by its superior size, by the abbreviation of the band crossing the cell [of the forewing] on the underside, and by the absence of the lowest spot in the discal series. The specimens before me vary from 22 to 24 millim. [= 90 to 95 of an inch] in expanse of wing; the band is only abbreviated in one of the larger specimens, and, though all have

the full number of sections to the discal band, the last two sections (they can hardly be called spots) are sometimes in line and sometimes decidedly out of line; the failure of the last spot of a discal series or the last section of a discal band is of frequent occurrence in the *Lycenidæ*; therefore, since both *N. ardates* and *N. bhutea* appear to be common in Sikkim, I feel some doubt as to the validity of the latter as a distinct species; at the same time, with only the figure of this form before me, I cannot positively assert that it is not distinct."

"I have, since the above was written, seen one imperfect specimen of *N. bhutea* in Mr. Moore's collection; I should certainly hesitate to describe so nearly-allied a form myself." (Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 71 (1885).)

With reference to Mr. Butler's remarks above, I have carefully examined the large series of specimens of the tailed and tailless forms of *N. ardates*, Moore, and of *N. bhutea*, mihi, captured in Sikkim, in the collection of Mr. Otto Möller. I find that the characters I gave as distinctive for the latter hold good: *N. bhutea* averages distinctly larger, the coloration of the upperside (not mentioned before) is darker, and the markings of the underside of forewing are also less numerous, and neither Mr. Möller or I have any difficulty in distinguishing between the two species. I may further add that before *N. bhutea*, I sent the type specimen to Mr. F. Moore for examination, and he gave opinion that it was a "species distinct from *N. ardates*." The female of *N. bhutea* has not yet been discovered. *N. bhutea* does not appear to have a tailless form.

A closely-allied species, if indeed distinguishable from *N. ardates*, is described as below from the Malay Peninsula, Borneo, and the Philippines.*

730 *Nacaduba ardates*, Moore. (PLATE XXVII, FIG. 185 ♂, TAILLESS FORM.)

Lycena ardates, Moore, Proc. Zool. Soc. Lond., 1874, p. 574, pl. lxvii, fig. 1; *Nacaduba* Moore, Lep. Cey., vol. i, p. 99, pl. xxxviii, figs. 2, 3a, male (1887); idem, id., l. c., vol. iii, p. 530 (1887); Nicolson, Journ. A. S. B., vol. liv, pt. 2, p. 3 (1885); id., Butler, Ann. and Mag. of Nat. Hist., vol. xvi, p. 335, n. 71 (1885); id., Doberty, Journ. A. S. B., vol. lv, pt. 2, p. 133, n. 174 (1886).

HABITAT: throughout India (except the desert tracts), the outer Himalaya, Burma, the Andaman and Philippine Isles.

EXPANSE: ♂, '85 to 1'10; ♀, '85 to 1'05 inches.

DESCRIPTION: "MALE. UPPERSIDE, both wings bluish-purple, exterior margin black. Hindwing with a short tail black. UNDERSIDE, both wings dark fawn-col. Forewing with two pale-bordered brown spots within and one below the cell, an irregular discal series, and a submarginal row of dentate lunules. Hindwing with an irregular sub-basal and discal pale-bordered brown band, a submarginal row of dentate lunules and contiguous marginal spots, a prominent subanal round black spot speckled with metallic green scales. Cilia greyish, with dark inner line." (Moore, l. c. in Proc. Zool. Soc. Lond., 1874). "FEMALE. UPPERSIDE, both wings violet-brown. Forewing with lower medial area suffused with cobalt-blue. Hindwing with a marginal row of white-bordered indistinct black spots, the penultimate more distinct." UNDERSIDE, both wings as in the male. (Moore, l. c. in Lep. Cey., vol. i, p. 90).

* *Nacaduba alata*, Druce. *Cypida alata*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 26, pl. xxxii, fig. 8, male; *Lampides alata*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. 1, p. 547, n. 4 (1877); *Nacaduba alata*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 417, n. 58 (1885); id., Distant, Rhop. Malay., p. 220, n. 4, pl. 28, fig. 14, male; 15, female (1884). HABITAT: Borneo (Druce), Sumatra (Young, Malacca (Distant), Mindanao, Philippines (Butler). EXPANSE: Male, 1'0; female, 9 of an inch. DESCRIPTION: MALE. "UPPERSIDE, both wings dark lavender-blue, outer margin brown. UNDERSIDE, both wings pale brown, crossed by nine broken white lines; an orange spot at the anal angle, with a black centre." (Druce, l. c.). "FEMALE. UPPERSIDE, both wings fuscous-brown. Forewing with a discal patch of bluish scales, the outer margin darker. Hindwing with the posterior margin darker and inwardly margined with greyish, before which are a marginal row of dark spots placed between the pterostigma. Cilia brownish-ochraceous. UNDERSIDE, both wings somewhat bright ochraceous, with the markings as in the other sex, but with the marginal row of dark spots on the upperside of the hindwing distinct beneath; the black spot near the anal angle with a few scattered greenish scales." (Distant, l. c.).

* Nearly allied to *L. (=N.) nova* of Felder, from Amboina, but smaller, with less acuminate forewing." (Butler, l. c. in Trans. Linn. Soc.)

Mr. Druce's figure and description of the male of this species are absolutely useless; from Mr. Distant's figures I judge that this species is indistinguishable from *N. ardates*, Moore, the latter being distinctly variable, especially in the colour of the ground on the underside.

"I took an aberrant male at Ranibagh, Kumaon. The transverse discal band of the underside is extremely broad on both wings, united with the disco-cellular streak. This aberration occurs in many *Lycenidæ*. I have a remarkable example of it in a specimen of *Nacaduba prominens*, Moore, from Bassein, Burma, and in one or two specimens of *Zinera maha*, Kollar, and *Z. sangra*, Moore, in which the discal spots are all very elongate below. Similar though much rarer variations occur in the *Argynnis* and *Cynthia* groups, of which I have an example in an *Atella*. One or two species have been based on these curious monstrosities." (Doherty, l. c.)

"Mr. Distant in his recent work '*Rhopalocera Malayana*' has divided the *Lycenidæ* into three groups, the first of which (*Curetaria*) lacks 'filamentous tail-like appendages' to the hindwing, while the other two groups (*Castalaria* and *Aphnaria*) possess these tails. This year [1884] I took many specimens of a lycenid in Sikkim in company with

"*ardates* which differed in no way from that species except in having no tails. On careful microscopic examination of these tailed and tailless forms, I can find no difference between respect of the venation; and as the markings are precisely similar, I conclude we have one and the same species. Mr. Distant, in forming his three groups (p. 196), whether the presence or absence of the tail 'may prove to be an uncertain and illusory character,' as an American naturalist [absolutely erroneously] has recorded that American species have a tailless spring brood, and a summer tailed generation. In my rate, both forms occur together, and in equal perfection as to condition, and both forms from Orissa." (de Nickville, l. c.)

L. Green informs me, in a letter dated July 19th, 1886, that 'the tailless form differs distinctly in its habits from the tailed form, sporting about in large numbers under the Madras-thorn trees in Colombo. The specimens of *N. ardates* that I catch are never seen but singly or in pairs, and have a more hesitating flight. In specimens the sinuous white lines on the underside are very much broader and more numerous than those of *N. ardates*. The female also differs in having a very much smaller head on the forewing, in some specimens the colouring being confined to three or four spots only. *N. ardates* is on the wing, up-country, during most months of the year. I have only been in Colombo during the spring months, when I caught this tailless form, so am unable to speak positively of its period of flight.'" (Moore, Lep. Cey., vol. iii, p. 30).

"The tailless form [of *N. ardates*], which, in Orissa and the Eastern and Western Ghâts, is almost as common as the tailed, apparently does not occur in Kumaon." (Doherty, l. c.)

The above extracts are all that have been printed regarding the tailed and tailless forms of *N. ardates*. They occur together below Masuri, in Sikkim, at Bholahât in the Malda district, at Shillong, in Orissa, at Ootacamund, in the Shevaroy Hills, and in Ceylon, and from no locality have I received the tailless form without receiving the tailed also, though in many localities (the Bombay presidency, Burma, and the Andaman Isles) the tailed form alone appears to exist. Whether these two forms are really one or two distinct species can only be definitely settled by breeding. Mr. W. C. Taylor of Orissa, Mr. G. F. Hampson of Ootacamund, Mr. E. E. Green of Colombo, Ceylon, consider these forms to represent distinct species and probably genera; Mr. Doherty and I hold to the opposite view. Mr. Hampson writes me that the tailed and tailless forms appear indiscriminately throughout the year, and both swarm in the lower slopes of the Nilgiris. Colonel Lang also writes that "I have taken both tailed and tailless *N. ardates* flying together above bushes in September in several localities in Kumaon. Khairna on the Kosi, 3,100 feet, Bagheswar, 3,200 feet on the Sarju, and in the 'Great gorge' of the Sarju, 3,600 feet. I certainly regard them as constituting only one species."

N. ardates, tailed form, presents considerable variation in the colour of the ground on the underside, females especially being sometimes bright golden ochreous. In India it occurs almost everywhere except in the desert tracts of Sind, and in the inner ranges of the Himalayas. The type specimens were taken at Parl and Pooneh, Kashmir. I do not know

where these two places are, through Poonch may be Poonch, which is a small State on the outer ranges bordering the plains. It has not been received by me from the Nicobar Isles, but occurs in the Andamans. If the *N. aluta* of Druce is, as I suspect, synonymous with *N. ardates*, then it occurs in the Malay peninsula and Borneo, and I have received the true *N. ardates* from the Philippines from Herr Georg Semper. It is the smallest and commonest species of the genus.

The figure shows both sides of a male of the tailless form from Sikkim in my collection.

731. *Nacaduba dana*, de N.

N. dana, de Nicéville, Journ. A. S. B., vol. lii, pt. 2, p. 73, n. 12, pl. i, fig. 15, male (1883); *N. dana*, Doherty, l. c., vol. lv, pt. 2, p. 133, n. 172 (1886). id., Hampson, l. c., vol. lvi, pt. 2, p. 358, n. 116 (1888).

HABITAT: Kumaon and the plains, up to 5,000 feet; Bholaht, Malda; Sikkim; Buxa, Bhutan; Chittagong district, Pegu Yoma, Myitta, Burma; Ootacamund, Nilgiris.

EXPANSE: ♂, .95 to 1.05; ♀, 1.05 inches.

DESCRIPTION: "MALE. UPPERSIDE, both wings violet-blue, with the outer margins evenly narrowly black. UNDERSIDE, both wings tawn-coloured. Forewing with a white-bordered dusky spot in the middle of the cell, a similar one at its end, a discal chain of six similar spots, the two lower ones out of line, (in some specimens the sixth lowest spot is absent); submarginal and marginal indistinct series of pale lunules. Hindwing crossed by three much broken bands of white-bordered dusky spots, and submarginal and marginal lunules as in the forewing, two small black spots at the anal angle on the margin. Cilia dusky throughout. FEMALE. UPPERSIDE, forewing black, the disc whitish and covered with pale blue metallic scales, the disco-cellulars marked with a black spot. Hindwing dusky, with pale bluish-white streaks between the nervules, a black disco-cellular spot, and obscure marginal pale lunules. UNDERSIDE, both wings cream-coloured, the markings as in the male, but all the spots and bands (except the two black anal spots) pale ochreous."

"Two male specimens were taken in the Sikkim Terai in July and August, 1881, by Mr. Otto Moller, and four males from Bhurkhul and one from Demagiri in the Chittagong district were taken by Mr. H. M. Panish in February, 1883. All these specimens are very constant, showing no variation whatever. They present a superficial resemblance to *N. ardates*, Moore, but are a different colour on the upperside; they have also no tail, and should therefore probably be placed in a different genus.* Mr. Otto Moller has also obtained numerous males at low elevations in Sikkim during the summer and autumn, including the female described, Mr. W. H. Irvine has sent it from the Malda district, the Calcutta Museum collector took it at Buxa, and I took it in the Great Runjit valley, Sikkim, in October." (de Nicéville, l. c.)

"Not so common as *N. ardates*, Moore. It is quite different from the tailless *N. ardates* of Orissa, the hindwing being broad and truncate" (Doherty, l. c.) Occurs in Sikkim in June, October, November and December. Mr. Otto Moller possesses three female specimens, which differ somewhat in the extent of the bluish-white coloration of both wings on the upperside; in the prominence or otherwise of the markings, and in the shade of the ground-colour, on the underside.

Colonel Lang reports *N. dana* as "rare at Naini Tal, 5,500—6,500 feet, May; Kosi Valley, Kumaon, 3,200 feet, July; Ranibagh, plains, 1,000 feet, October." Mr. Hampson reports (l. c.) that it occurs commonly in the Nilgiri Hills from 2,000 to 4,000 feet elevation.

732. *Nacaduba hampsonii*, de N.

N. hampsonii, de Nicéville, Journ. A. S. B., vol. lv, pt. 2, p. 118, pl. ii, fig. 13, male (1885); *N. hampsonii*, Hampson, l. c., vol. lvii, pt. 2, p. 358, n. 117 (1888).

HABITAT: Dehra Dun; Ootacamund, Nilgiri Hills.

EXPANSE: ♂, 1.15 inches.

* I have since examined the venation of this species, and as it does not differ in the smallest particular from that of *N. ardates*, Moore, I do not now think that it should be placed in a different genus.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* deep shining violet-purple, the outer margins narrowly black. UNDERSIDE, *both wings* pale brown. Forewing tinged with ochreous on the inner margin extending into the disc, bearing the following blackish markings outwardly defined with white:—a quadrate spot across the middle of the cell with a small spot above it on the costa, a similar but larger one closing the cell, a discal curved chain of six spots (which is shifted inwards at the penultimate spot from the inner margin), and a double submarginal series of lunules. Hindwing marked with some indistinct spots at the base, then four subbasal ones extending across the wing, another closing the cell, and a much curved and irregular discal series; submarginal lunules as in the forewing, but bearing three black spots towards the anal angle, the outermost one largest and prominent, the others small; the usual anteciliary black line. Cilia pale brown, on the hindwing marked with dark brown at the ends of the nervules. No tail."

"Nearest to the tailless *N. dana*, de Nicéville, which also occurs at Ootacamund, but differing on the upperside in being of a different colour (deep violet-purple instead of light bluish-purple), and on the underside in having the markings throughout darker and more conspicuous, and the ground colour also darker. The forewing is also narrower and more produced at the apex." (*de Nicéville*, l. c.) "Male fairly common from 2,000 to 4,000 feet [in the Nilgiris], female unknown. The wet-season form has dusky markings on the underside similar to those of *N. macrophthalma*, Felder, but more variable in extent." (*Hampson*, l. c.)

This species has now been known some three or four years, but it has only been found in the Nilgiris and the Dehra Dun, and its female is still unknown. It is a very distinct and well-marked species. Mr. G. F. Hampson has taken it in considerable numbers on the southern slopes of the Nilgiris, and Mr. P. W. Mackinnon has sent me a single male taken in the Dehra Dun, Western Himalayas, on 29th August, 1888, and he informs me that he has only one other specimen.

The second subgroup has the first subcostal nervule of the forewing connected to the costal nervure by a short spur, a character which occurs in two Indian genera only, *Jamides*, Hubner, and *Lampides*, Hübner. Both these genera have a short filiform tail from the apex of the first median nervule of the hindwing. I can find no structural character whatever by which to separate them, but they are abundantly distinct in *facies*, the males of *Jamides* rivaling the magnificent South-American *Morphos* in the brilliance of the steel blue or purple coloration of the upperside, the forewing with a broad outer black border; the females are of quite a dull blue on the upperside; while in *Lampides* the differences between the sexes are not nearly so great, the females have a rather broader black border on the upperside than the males; the coloration of the upperside in one group of this genus is pale milky bluish-white, in the other azure-blue with a slight metallic lustre. Both genera are furnished with narrow more or less continuous white bands on the underside, the hindwing with the usual black spot on the margin in the first median interspace crowned with orange; the basal area of the forewing unmarked. The two genera occur almost throughout the Indo-Malayan region, and *Jamides* has been recorded from Australia. The males have no secondary sexual characters.

Genus 110.—JAMIDES, Hubner. (PLATE XXVII.)

Jamides, Hübner, Verz. bek. Schmett., p. 71 (1816); id., Moore, Lep. Cey., vol. i, p. 86 (1881); id., Bristant, Khoy. Malay., p. 220 (1884).

"FOREWING, elongate, triangular; *costa* slightly arched at the base, *apex* very [slightly] acute, *exterior margin* slightly oblique and convex, *posterior margin* long; *costal nervure* bent upwards near its end to the costa, extending to half length of the margin; *first subcostal nervule* short, emitted at nearly one-half before the end of the cell and slightly touching the costal nervure at its angle; *second subcostal* at one-third before the end of the cell; *third subcostal* close to the end; *fourth subcostal* at nearly one-half from the third and terminating at the apex; *fifth subcostal* from the end of the cell; *disco-cellular nervules* slightly waved, radial [*lower discoidal*] nervule from their middle; *discoidal cell* broad, long, extending to more than half the wing; *second median nervule* emitted at one-sixth before the end of the cell, *first median* at nearly one-half

before the end; *submedian nervure* straight. *HINDWING*, short, triangular, with a slender tail from the end of the first median nervule; *costal nervure* arched and extending to the apex; *disco-cellular nervules* slightly oblique, *discoidal nervule* from their middle; *discoidal cell* short, broad; *second median nervule* emitted before the end of the cell, *first median* at nearly one-half before the end; *submedian nervure* straight; *internal nervure* recurved. *BODY*, slender, short; *palpi* porrect, second joint projecting half length beyond the head, clothed with adpressed scales, third joint naked, slender, about half length of the second; *legs* slender; *antennæ* with a thick club; "eyes hairy. (Moore, l. c.)

The costal nervure of the forewing is very short and ends on the margin considerably before the apex of the discoidal cell, the first subcostal nervule is of average length and is connected to the costal nervure by a short spur, the former is bent downwards at the point of union, the second subcostal arises quite close to the base of the first, the upper discoidal arises from the subcostal nervure quite three times as far from the base of the second subcostal as the latter does from the base of the first, the third subcostal arises about midway between the apex of the wing and the base of the upper discoidal; upper disco-cellular slightly outwardly oblique, lower disco-cellular upright, distinctly longer than the upper. I can find no structural character of sufficient importance to put into words by which this genus can be separated from the next. On this subject Mr. Doherty writes "I am not aware of any difference between *Jamides* and *Lampides*, and think it likely that the former genus will have to fall before the latter, which occurs earlier in Hübner."

The genus *Jamides* contains I believe but a single species. It has a very wide range, occurring in India on the lower slopes of the outer ranges of the Himalayas, throughout continental and peninsular India except the dry North-West, in Assam, Burma, the Malay Peninsula and Archipelago, Ceylon, the Andaman and Nicobar Isles, in China, and in Australia. The male on the upperside of the hindwing and on the basal area of the forewing is most resplendent shining metallic steely-blue or purple, the costa, apex and outer margin of the forewing widely black, hindwing with a narrow black outer margin. Underside castaneous-brownish, crossed by narrow fine whitish lines, a large black spot surrounded by orange at the base of the tail. The female on the upperside has no metallic lustre, but is dull blue, with a series of bluish lunules on the hindwing along the rather broad outer black border. The transformations of the species are unknown, but Mr. E. E. Green informs me that in Ceylon he has observed the female butterfly laying eggs upon the pods of various *Leguminosæ*.

733. *Jamides bochus*, Cramer.

Papilio bochus, Cramer, Pap. Ex. vol. iv, p. 210, pl. ccxcxi, figs C, D, male (1782); *Jamides bochus* Hübner, Verz. bek. Schmett., p. 71, n. 708 (1816); id., Moore, Lep. Cey., vol. i, p. 86, pl. xxxvi, figs. 8, male; 9, female (1881); *J. bochus*, var., Distant, Rhop. Malay., p. 222, n. 1, pl. xxi, figs. 19, male; 20, female (1884); *Polyommatus bochus*, Godart, Enc. Méth., vol. ix, p. 661, n. 150 (1823); *Lycana bochus*, Staudinger, Ex. Schmett., p. 272, pl. xciv, male (1888), (*L. plato* on plate); *Hesperia plato*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 288, n. 103 (1793); *Papilio plato*, Donovan, Ins. Ind., pl. xlv, fig. 2 (1800); *Polyommatus plato*, Godart, Enc. Méth., vol. ix, p. 655, n. 227 (1823); id., Blanchard, Voy. Pôle Sud, vol. iv, p. 398, pl. iii, figs. 9, 10, male (1853); *Lampides plato*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 18, pl. ii, fig. 3, female (1869); id., Semper, Journ. des Mus. Godef., vol. xiv, p. 156, n. 54 (1879); *Lycana plato*, Westwood, Gen. Diurn. Lep., vol. ii, p. 490, n. 42 (1859); *Hesperia democritus*, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 285, n. 94 (1793); *Polyommatus democritus*, Godart, Enc. Méth., vol. ix, p. 656, n. 132 (1823); *Lampides democritus*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 19 (1869); *Lycana mila*, Horsfield, Cat. Lep. E. I. C., p. 78, n. 14 (1828); *Lampides plato*, var. *nicobariæ*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. i, pt. 6, p. 234, n. 34 (1881).

HABITAT: India, Ceylon, Andaman land, Nicobar Islands, Burma, Malay Peninsula, Sumatra, Java, Balaou, Formosa, Australia.

EXPANSE: ♂, '9 to 1'35; ♀, 1'2 to 1'5 inches.

DESCRIPTION: "MALE UPPERSIDE, both wings pure deep blue with a rich metallic lustre, changing, according to the light, to a brilliant sea-green. *Cilia* grayish-brown. *Forewing* with a broad black posterior border stretching towards the middle of the costa. *Hindwing* surrounded by an intensely black marginal thread; near the anal angle, at the caudal appendage,

a lunular-oblong black spot, bordered externally by an obscure white thread extending to the anal angle. **UNDERSIDE**, both wings yellowish-brown with a straw-coloured shade, and transversely marked, in the forewing with seven, and in the hindwing with nine very delicate yellowish strigæ covered with a faint golden lustre; three being marginal and continued through both wings. *Forewing* is further* marked, in the space comprised between the middle and the marginal series, with two pairs of strigæ, one short consisting of two lines parallel to each other immediately on the disc, the other extending across the whole surface in an angular curve, composed of short lines somewhat flexuose between the longitudinal nerves, with a sudden inflection on the disc, by which the posterior portion is directed towards the short pair; viewed together as arranged on the wing, these strigæ exhibit a figure somewhat resembling the letter Y. *Hindwing* bears also three pairs of strigæ; the first at a small distance from the base, the second in the middle stretching across the disc with a curve at the interior margin, the third posterior to this and terminated at the anal ocelli; they are individually composed of parallel interrupted portions; three ocellate spots are at the posterior margin near the anal angle; the exterior one large, nearly circular, abruptly terminated behind by a streak of silvery irroration, and surrounded anteriorly and at the sides with a narrow rufous iris; intermediate ocellus reniform, of the most intense tint on the lobe touching the extreme ocellus, which is larger and more distinct than in the related species [*Nacaduba parvana*, Horsfield]; the two last ocelli are united at their internal edge by a silvery lunule bordered with a rufous streak. *Tail* black tip with white. *Antennæ* obscurely banded. *Body* blackish above, white underneath." (Horsfield, l. c.) "FEMALE. **UPPERSIDE**, both wings bright but non-metallic blue. *Forewing* with the costal and outer margins broadly (broadest at apex) blackish. *Hindwing* with the costal and abdominal margins fuscous, the posterior margin narrowly black, with two submarginal waved fuscous linear fasciæ, and a large marginal black spot inwardly bordered with bluish between the second and first median nervules. **UNDERSIDE**, both wings paler in hue, but marked as in the male." (Distant, l. c.)

As regards coloration, the male of this species is perhaps the most lovely of the Indian "blues," its brilliancy rivalling some of the South American species of *Morpho*. It is a common and widely distributed species, occurring all along the low outer valleys of the Himalayas, but not in the desert region of Sind, throughout continental and peninsular India, in Ceylon, the Andaman Isles, and on Kamorta, Nankowri, Katschall, Trunkutt, Teressa, and Great Nicobar Islands, in Assam, Burma, the Malay Peninsula, Java, Sumatra, Formosa, and Australia. In Ceylon Mr. Hutchison says that it "has a quick flight, darting from point to point among hedges on the roadside, and settling on the leaves." This I can confirm, in Calcutta it seems invariably to frequent trees and bushes, and always settles with closed wings. As it flashes past and suddenly settles on a leaf with its dull-coloured underside exposed, the disappearance of such a brilliant little object is somewhat startling.

There is a slight doubt in my mind regarding the identification of this species with Cramer's *doctus*, as in the figure of the underside he shews the forewing entirely unmarked, the hindwing with two black white-encircled anal spots only, none of the narrow white catenulated bands being given. As however the coloration of the upperside is very characteristic, and Cramer records the butterfly from Ceylon, where no other species occurs which will fit the figures better, I feel nearly sure that he intended to portray the species under discussion.

Local race *nicobaricus*, Wood-Mason and de Nicéville. (PLATE XXVII, FIG. 186 ♂).

DESCRIPTION: "MALE. **UPPERSIDE** differs from specimens of the same sex from Calcutta, Sikkin, South India, Ceylon, and Bombay in the greater extent of the blue on the *forewing*, the broad black outer border of which does not stretch back towards the middle of the costa in the manner described by Horsfield." (Wood-Mason and de Nicéville, l. c., Journ. A. S. B., vol. I.)

* In this case "further" does not mean that there are additional markings to those just mentioned above by the writer, but that he now proceeds to give further details regarding them.

This local race, occurring on the Andaman and Nicobar Isles, appears to be well-marked and easily distinguished in the male by the outer black border of the forewing being of nearly equal breadth throughout and not extending along the costa as it does in Indian specimens. The female, however, is quite similar. Mr. Distant, writing of a Malay peninsular (Province Wellesley) specimen, notes: "This is a variable species, especially in the male sex. The male specimen here described and figured differs from the typical form of the species in the greater amount of melanism, or increase of the black coloration to the forewing; whilst the variety *nicobaricus* varies contrariwise by the greater extent of the blue area. Only one male specimen having been collected, it will remain to be discovered whether this varietal male form is of a constant or local character in the Malay Peninsula, as the females are indistinguishable from Ceylonese examples." Judging from a large series of specimens, the Andaman and Nicobar race would appear to be very constant; but this is not the case with specimens from various parts of India, where in some specimens of both sexes the blue area of the upperside is twice as extensive as it is in others, these variations being no doubt largely due to seasonal causes, the specimens with the greatest amount of black being found during the rains.

The figure shows both sides of a male specimen of the local race *nicobaricus* from the Nicobar Isles in the collection of the Indian Museum, Calcutta.

Genus 120.—LAMPIDES, Hubner. (FRONTISPIECE)

Lampides, Hubner, Verz. bek. Schmett., p. 70 (1816), id., Moore, Lep. Cey., vol. i, p. 94 (1881); id., Distant, Rhop. Malay., p. 206 (1884).

"FOREWING, somewhat broad, nearly triangular; *costa* arched, *exterior margin* slightly oblique and convex, *posterior margin* acute [*sic*]; *costal nervure* short, curved, bent upwards to the costa near its end; *first subcostal nervule* bent upwards and joined to the costal nervure by a short spur, emitted at one-half before the end of the discoidal cell, *second subcostal* at one-third, *third subcostal* at one-eighth before the end, *fourth subcostal* at one-half from the third and terminating at the apex, *fifth subcostal* [upper discoidal] from the end of the cell; [*middle* and *lower*] *disco-cellular nervules* curved, *lower discoidal* from their middle; *discoidal cell* broad; *third median nervule* emitted at one-eighth before the end of the cell, *first median* at one-half before the end; *submedian nervure* straight. HINDWING, somewhat broad, triangularly-oval, *apex* convexly-angular, *exterior margin* very oblique, slightly angled at the end of the first median nervule, and a slender *tail* extending from the angle; *abdominal margin* long; *costal nervure* much arched at base, extending to apex, *first subcostal nervule* emitted at one-fifth before the end of the cell, *disco-cellular nervules* outwardly oblique; *discoidal nervule* from their middle; *discoidal cell* broad; *third* and *second median nervules* emitted from the end of the cell; *first median* at nearly one-half before the end; *submedian* and *internal nervures* straight. BODY slender, short; *palpi* perfect, second joint projecting about half its length beyond the head, clothed with long adpressed scales, third joint very long, slender, naked; *legs* slender; *antennae* with a lengthened grooved pointed club; *eyes* hairy. Type *L. alsanus*, Fabricius." (Moore, l c)

In the forewing the costal nervure is very short, terminating on the margin before the apex of the discoidal cell; the short spur joining the first subcostal nervule to the costal nervure is a feature present in *Jamides*, Moore; the base of the second subcostal is about half as near to the base of the first subcostal as it is to the base of the upper discoidal; the third subcostal is emitted about midway between the base of the upper discoidal and the apex of the wing; the disco-cellular nervules are nearly upright, slightly concave, the middle one rather shorter than the lower; the second median nervule emitted some distance before the end of the cell. In the hindwing the first subcostal nervule is emitted rather near to the apex of the cell, the second median nervule given off just before its lower end. Structurally this genus hardly differs from *Jamides*, Hubner, and what differences there are are so slight that they can hardly be expressed; but the style of coloration and markings will easily distinguish them.

The transformations of two species are known. The larva is of the usual lycenid shape, colour dull reddish-green, with a dorsal and a lateral darker line on each side. Pupa of the usual form, brown, spotted and marked with darker.

Lampides appears to be a purely tropical and subtropical oriental genus, occurring almost throughout India, in Ceylon, the Andaman and Nicobar Isles, Burma, and the Malay peninsula and islands, but, unlike *Nacaduba*, *Jamides*, and *Catochrysops*, has not been recorded from Australia. There is a great similarity in the markings of all the species of the genus: the upperside of the male is either metallic azure-blue or bluish-white* (thus enabling one to divide them into two groups), with a more or less wide outer black margin, which is reduced to an anteciliary thread on the hindwing; the females are paler blue, with the black border to the forewing very broad, broad on the hindwing also, enclosing a series of lunules of the ground-colour. The markings of the underside in both groups are much the same, three marginal white lines being common to both wings, the forewing having four, the hindwing six similar lines across the disc. The arrangement of these markings and the details of the ocelli near the anal angle of the hindwing afford excellent specific distinctions.

On the underside of the forewing, the four discal strizæ form good characters by which to distinguish the different species, and hence may be designated the "characteristic" strizæ: the one nearest the base being distinguished as no. 1, and that nearest the exterior margin as no. 4. These lines are sometimes continuous and carried in a gentle curve partly or wholly across the wing transversely from the costa to the interior margin: sometimes they are broken up into fragments more or less out of line: sometimes they are completely dislocated and the lower fragments shifted completely out of line. The two original species, *L. elpis*, Godart, and *L. alianus*, Fabricius, are clearly distinguished by these strizæ.

In *L. elpis* the four strizæ are quite distinct from one another and more or less parallel: nos. 1 and 2 are long and parallel, arising at some distance from the costa and nearly reaching the inner margin: nos. 3 and 4 are short, arising close to the costa and ending on the second and third median nervules respectively.

In *L. alianus* all four strizæ arise close to the costa, and in this case nos. 1 and 3 are the long and nos. 2 and 4 the short strizæ: the long strizæ being subject to dislocation of their lower portions, which may thus appear to form the lower straight strokes of one or two Ys. This is fully described under the species.

L. coruscans, Moore, *L. kondulana*, Felder, and *L. kankana*, Felder, form a group with the strizæ arranged as, or nearly as, in *L. elpis*: and may be distinguished by the absence of Ys.

L. alianus, Fabricius, presents either two Ys, one Y formed of strizæ nos. 1 and 2, or one Y intermediate between nos. 1 and 4 strizæ, in some cases having no Ys; but in this case the long strizæ are nos. 1 and 3, in *L. elpis* the long strizæ are nos. 1 and 2.

L. pura, Moore, and *L. pseudopsis*, Butler, present a medial Y between strizæ nos. 1 and 4.

L. subdita, Moore, and *L. kinkurka*, Felder, present a basal Y formed of strizæ nos. 1 and 2.

The great difficulty there is in identifying the species of this genus has led to the following remark by Mr. Doherty:—"It is to be hoped that no more species of this genus will be described without an examination of the prehensores of the males, which are fortunately of great diversity in the different kinds, as if to counterbalance their puzzling similarity in colour and markings."

In India, where, as a rule, the climate may be divided into two well-marked divisions, a dry and a wet, much seasonal dimorphism obtains in the typical species of each group. In the dry-season broods of *L. elpis*, this takes the form of the metallic azure colour of the upperside of the male being of a paler shade; of the marginal black markings of the upperside of the hindwing of the female being much less prominent, and often, indeed, more or less obsolete; and of a pale ferruginous shade being substituted, with concomitant blurring of the white markings, for a plumbeous one in the ground-colour of the underside of both sexes. The seasonal changes in *L. alianus* are of even greater extent and distinctness. If the dry-season

* *L. marahota*, Doherty, MS, is an exception to this almost universal style of coloration, the male being light green on the upperside, vide description on page 174.

be compared with the wet-season broods, it will be seen that in the former, on the upperside of the female, the outer black border of the forewing is half the width, and the black markings on the hindwing are very much reduced, both sexes have the underside extremely variable and more or less variegated in coloration and markings, the white lines often forming edgings for very well-defined and distinct broad dark bands; the anal ocelli of the hindwing are reduced or obsolete, and the orange lunule crowning the large subanal ocellus is very small or altogether wanting.

Wherever they are met with the species of *Lampides* are common, and very conspicuous on the wing. They affect trees and bushes, and appear to prefer "checkered shade" to the open glare of the sun. The larvæ and pupæ are of the usual lycænid shape, having nothing distinctive about them.

Key to the Indian species of *Lampides*.

- A. Males, upperside, both wings metallic azure blue
- a. Both sexes underside, forewing with the four discal white strizæ parallel, fourth stria from base ending on third median nervule
 - ♂¹. Male, upperside, both wings light metallic azure blue.
 - 734 *L. ELPIS*, Eastern and Southern India, Ceylon, Andamans, Burma, Malay peninsula and islands
 - ♂¹. Male, upperside, both wings dark metallic azure blue
 - 735 *L. CORUSCANS*, Ceylon, Chittagong Hill Tracts, Burma, Singapore Nicobars.
 - β. Both sexes underside, forewing with the four discal white strizæ not parallel; fourth stria from base ending on second median nervule
 - ♂¹. Second and third strizæ from base forming a Y inner of the three marginal white lines on underside of hindwing slightly lunular, not enclosing dark spots orange lunule to subanal ocellus moderate or small
 - 736 *L. PSEUDOLIS*, Ceylon Malay peninsula and islands.
 - ♂¹. First and second strizæ from base forming a Y inner of the three marginal white lines on underside of hindwing highly lunular, enclosing fuscous spots orange lunule to subanal ocellus very large
 - 737 *L. SUBDITA*, Burma.
- B. Males, upperside, both wings pale bluish milky white
- a. Both sexes, underside, forewing with fourth white stria from base ending on second median nervule, some of the strizæ usually not on Vs
 - ♂¹. Males, upperside, forewing with no submarginal c, by fascia.
 - ♂¹. Male with more or less broad outer black margin to forewing on upperside.
 - 738 *L. ALIUS* India Ceylon, Andamans, Burma, Malay peninsula, Siam, Malay archipelago
 - ♂¹. Male with fine black marginal thread only to forewing on upperside.
 - 739 *L. PURA*, Assam, Chittagong Hill Tracts, Mergui.
 - ♂¹. Male, upperside, forewing with a submarginal dusky fascia.
 - 740 *L. KINKURKA*, Nicobars
 - β. Both sexes, underside, forewing with fourth white stria from base ending on third median nervule, all the strizæ parallel.
 - ♂¹. Male, upperside, forewing with diffused fuscous striolæ before the margin, outwardly resting on an obsolete white line.
 - 741. *L. KONDULANA*, Nicobars
 - ♂¹. Male, upperside, forewing with no fuscous striolæ before the margin.
 - 742. *L. KANKANA*, Nicobars.

734. *Lampides elpis*, Godart.

Polyommatus elpis, Godart, Enc. Méth., vol. ix, p. 654, n. 125 (1823), *Lycæna elpis*, Horsfield, Cat. Lep. E. I. C., p. 76, n. 11, pl. 1, fig. 4, male (1828), pl. iv, figs. 16 a, structure of imago (1829), id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 24, n. 18 (1857), id., Snellen, Tijds. voor Ent., vol. xix, p. 150, n. 44 (1876), *Lampides elpis*, Moore, Proc. Zool. Soc. Lond., 1878, p. 833, id., de Nicéville, Journ. A. S. B., vol. 1, pt. 2, p. 52, n. 44 (1881), idem, id., Notes on Indian Insect Pests, vol. 1, p. 11, pl. i, figs. 5a, male, 5b, larva (1889), id., Moore, Lep. Cey., vol. 1, p. 95, pl. xxxviii, figs. 4, male; 4a, female (1881); id., Distant, Rhop. Malay, p. 226, n. 1, pl. xxi, figs. 25, male, 26, female (1884), id., Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xvi, p. 335, n. 72 (1885).

HABITAT: Malda, Sikkim, Calcutta, Assam, Orissa, Bangalore, Calicut, Nilgiris, Wynad, Travancore, Ceylon, Andaman Isles, Burma, Malay peninsula, Java, Borneo, Philippines.

EXPANSE: ♂, ♀, 1·2 to 1·8 inches.

Wet-season form.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale azure with a silvery somewhat lutescent gloss. *Forewing* with a narrow blackish-brown posterior [outer] margin. *Hind wing* with a broader border of the same colour, consisting of three parallel strigæ, one exterior narrow and continued; the second intermediate, composed of a series of oblong spots more intensely coloured towards the anal angle; the third and interior one broad, waving and evanescent. [These three strigæ are very marked in some specimens, entirely absent, except the outermost one, in others from the same locality.] UNDERSIDE, *both wings* grayish-brown, and in well-preserved individuals the tint is deeper, and a rich silvery reflexion is spread over it. *Forewing* with seven, *hindwing* with nine white strigæ, three of which are marginal and agree with those of the two former species [*L. alianus*, Fabricius, and *L. celerio*, Fabricius] *Forewing* with four white strigæ arranged in two pairs on the medial and submarginal portions of the wing; the strigæ of the interior pair are continued, they arise, parallel to each other, at a small distance from the costa, pass in a somewhat angular curve across the disc, and come in contact with the interior margin near the inner one of the marginal strigæ; the next pair consists of interrupted short linear fragments, arises from the costa, having near its point of contact two or three small lateral dots, stretches half across the wing, and is terminated on the disc by a short lineola, disposed intermediately between the two or along the interior striga. The arrangement of these strigæ is permanent and affords clear characters for a specific distinction. *Hindwing* marked between the base and the margin with six transverse strigæ, agreeing generally with those of *L. alianus* and *L. celerio*, the only apparent difference is that they are somewhat broken and interrupted in their course. The anal ocelli are not in any degree different from those in *L. celerio*. The *thorax* and anterior part of the *abdomen* are covered with a grayish or light blue and silvery down: the sides of the *abdomen*, and the *antenna* are annulated. Our collection contains one specimen of a variety on which a pure azure extends uniformly over the upperside. FEMALE. UPPERSIDE, *both wings* have the azure tint [of the male] somewhat diluted. *Forewing* has a very broad dark brown posterior border, stretching obliquely to the middle of the costa. *Hindwing*, the border has a blackish tint, and the oblong spots of the intermediate series are encircled with white." UNDERSIDE, *both wings* like the male. (Horsfield, l. c.)

The above minute and excellent diagnosis was made by Dr. Horsfield from Javan specimens, and applies exactly to the species as it exists in India, but it may be noted with regard to the males that the three parallel strigæ on the upperside of the *hindwing* appear in some specimens only, in others are more or less absent, in others again quite obsolete, and that all forms occur in the same locality; but whether this variability is due to seasonal causes or not I am unable to say.

Dry-season form.

DESCRIPTION: MALE and FEMALE. UPPERSIDE, *both wings* with the blue colour paler. UNDERSIDE, *both wings* differ in the ground-colour, which, instead of being "grayish-brown," almost plumbeous, as in the wet-season form, is of a pale ferruginous colour which suffuses all the white markings, imparting to them a blurred and indistinct appearance. This form probably occurs everywhere where there are two well-marked seasons, a dry and a wet; I possess specimens from Malda, Sikkim, Calcutta, Orissa, and several parts of Assam. Seeing how *L. alianus* has been split up, and its local, varietal, and seasonal forms described as distinct species, I am surprised that the dry-season form of *L. elpis*, which is quite as distinct as many named forms of *L. alianus*, has so far remained undescribed.

"LARVA dull pale green, tinged with red on dorsal area; three reddish narrow dorsal stripes [one dorsal, two lateral]; spiracles minute, black; head small, brown, retracted beneath the second segment, length when full fed .55 of an inch. Feeds in Ceylon on the fruit of the cardamom, *Elettaria cardamomum*. PUPA smooth, pale dull yellowish-brown, marbled and spotted with dark brown, spots coalescing into three irregular dorsal stripes" (*E. E. Green* in litt.) As the cardamom only grows, I believe, in South India and Ceylon, the larva of *L. elpis* must have other food-plants throughout its wide range where the cardamom is not found. Mr Green found only one larva, and says that he did not notice that it was furnished with the special organs affected by ants.

L. elpis is usually a much rarer species than *L. anans*; but both occur about equally commonly in Sikkim, which may, perhaps, be exceptional in this respect. It has a rather more restricted range also than its congener, not occurring at all in the Bombay district or in the Deccan. It presents a curious appearance on the wing, as, on account of its alternately completely opening and shutting its wings in flight, the contrast between the brilliant metallic-blue of the upper surface and the dark dull underside is very striking. Mr. Butler notes that "Indian examples are slightly more azure in tint than those from Java, but do not otherwise differ." However, as above pointed out, Indian specimens do often differ from those described by Dr. Holsfield in the entire absence or presence of the second and third marginal stripe on the upperside of the hindwing in the males.

Mr. Distant has figured (without tails), but not described, what is probably the wet-season form of this species in his "*Rhopalocera Malayana*," pl. xxi, fig. 24, male, while his figure 25 seems to represent a male of the dry-season form.

735 *Lampides coruscans*, Moore.

L. coruscans, Moore, Ann and Mag. of Nat. Hist., fourth series, vol. xx, p. 341 (1877), idem, id., Lep. Ceyl., vol. 1, p. 96, pl. xxxvi, figs. 9, 9b, male, 9a, female (1881)

HABITAT: Ceylon, Chittagong Hill Tracts, Burma, Nicobar Isles, Singapore.

EXPANSE: ♂, ♀, 1.2 inches.

DESCRIPTION: "MALE UPSIDE, both wings brilliant glistening cobalt-blue. Forewing with a very narrow black speckle-bordered marginal band. Hindwing with a narrow black marginal line and speckled black spots. Cilia black, with whitish outer edge on the forewing, and inner white line on the hindwing. UNDERSIDE, both wings pale leaden-grey. Forewing with two narrow white transverse discal lines, a short upper intermediate streak, a short outer line, a double marginal row of white dentate marks with blackish intermediate space, and marginal line. Hindwing with several interrupted narrow white transverse lines, a submarginal prominent double dentate line with black intermediate space, and marginal line; a large subanal ochreous bordered black spot. FEMALE. UPSIDE, both wings greyish-blue. Forewing with a black outer band, which is confined to the apex and outer margin. Hindwing with a blackish anterior border, and a submarginal dentate band enclosing a marginal row of black spots." UNDERSIDE, both wings like the male.

"Allied to *L. pluto* [= *Jamides bochus*, Cramer], but of a less glittering colour on the upperside, and without the broad black band in the male." (Moore 1 c in Ann. and Mag. of Nat. Hist.)

Mr. Moore's figure of this species shows on the underside of the forewing a short white line across the middle of the cell, a discal line from the subcostal to the submedian nervure, another line beyond approaching the costa somewhat more closely than the last, and a fourth shorter indistinct subapical line, all these lines parallel to one another. This arrangement does not agree with any species of the group known to me. I identify this species by its deeper coloration more approaching that of *Jamides bochus*, and by its smaller size, specimens agreeing with these characters occurring in Ceylon with *L. elpis*, Godart. The characteristic striae of *L. coruscans* are arranged generally as in *L. elpis*, nos. 1 and 2 from the base arising at a distance from the costa, curving parallel to one another across the disc to the inner margin; nos. 3 and 4 arising on, or close to, the costa and extending to the third median nervule, where there is a short fragment reaching the second median nervule, common to

the pair, and forming the lower stroke of the Y of which they are the upper arms. Thus, *L. coruscans* appears to be a form of *L. elpis* in which the tint of the upper surface is decidedly deep azure-blue, and which is, moreover, of a smaller size. I possess a male specimen of this species from Ceylon, one from the Chittagong Hill Tracts, two from Teressa (one of the Nicobar Isles), and one from Singapore. It may be that these specimens represent a form not really specifically distinct from *L. elpis*, but the species may be retained as such at present, pending the results of further local research and experience.

In Ceylon *L. coruscans* is "Plentiful in the Kottawa forest, Galle. Easy to capture" (Wade). "Western and Southern Provinces. Plains, in forest land; during S.W. monsoon, fluttering about bushes in open glades of the forest; not common" (Hutchinson).

In the Payre Museum, Rangoon, is a single male from Palone, in Burma, taken in January, which measures a good deal more than the above-noted specimens; it also differs in its still darker tone of colour on the upperside, and the black margin is considerably diffused over the apex and outer margin of the wing.

Mr. Distant records *L. kankana*, Felder, from the Malay peninsula and Borneo, and places the *Cupido carulea* of Druce as a synonym of that species. The original description of the latter species is so inadequate and the figure is so obviously incorrect that without reference to the type specimen it is impossible to exactly determine the species. It appears probable, however, that it is very near to or perhaps synonymous with *L. coruscans*, Moore; in the latter case *L. carulea* would have priority. But Mr. Distant must be mistaken in saying that *L. kankana* and *L. carulea* are one species, and that the former occurs in the Malay peninsula, as Dr. Felder describes *L. kankana* as "Ma.e. Upperside pale silvery-blue," i. e., of the *aliatus* group. Mr. Distant describes it as "Male, Upperside dark, shining, azure-blue," i. e., of the *elpis* group, and apparently of the exact shade of *L. coruscans*. There can be hardly any doubt that Mr. Distant has wrongly identified this species, more especially as he does not record the true *L. coruscans* from the Malay Peninsula, where it undoubtedly occurs. Mr. Butler records *L. carulea* from Ceylon, no doubt quite correctly. I give below Mr. Distant's description of it with its synonymy as set down by him, and also Mr. Druce's description of *L. carulea*.*

* *Lampides kankana*, Distant, Rhop. Malay, p. 229, n. 3, pl. xx, figs. 18, male; 17, female (1884); *Lycana kankana*, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 106 (1862); idem, id., Reise Novara, Lep., vol. ii, p. 370, n. 331, pl. xxxiv, fig. 37, male (1865); *Lampides kankana*, Moore, Proc. Zool. Soc. Lond., 1877, p. 588, id. Wood-Mason and de Nicville, Journ. A. S. B., vol. i, pt. 2, p. 235, n. 38 (1881). *L. kankana*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 10 (1877); *Cupido carulea*, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 13, pl. xxxii, fig. 6, male; *Lampides carulea*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 7 (1877). HABITAT: KAR NICOBAR (Felder), Sungei Ujong (Distant), Malacca (Butler and Distant), Singapore (Distant), Ceylon (Butler), Borneo (Druce and Butler). EXPANSE: Male and female, 1.0 to 1.3 inches. DESCRIPTION: "MALE. UPPERSIDE, both wings dark, shining, azure-blue. Forewing with the costal margin narrowly, and the outer margin (especially at apex) rather more broadly blackish. Hindwing with the outer margin narrowly blackish, and with two transverse black lines outwardly margined with whitish at the anal angle. Tail-like appendage black, with the apex white. UNDERSIDE, both wings dark greyish-brown, with a plumbeous tinge, and crossed by the following greyish-white linear fasciae arranged in pairs:—forewing with two crossing the end of the cell and then dislocated and extending to the inner margin, followed by two, likewise dislocated, commencing near the costa, and terminating at the third median nervule continued by a short, single intermediate one reaching the second median nervule, two submarginal and one marginal; hindwing with three pairs more or less dislocated, two waved submarginal and one marginal; a large black marginal spot containing a few scattered bluish scales, and inwardly broadly surrounded with ochraceous, situated between the second and first median nervules, and at anal angle a black transverse angulated streak, margined with greyish-white, and inwardly bordered by a few bluish scales and a small ochreous spot. Body above with the thorax more or less concolorous with the wings, the abdomen greyish-brown, with the lateral segmental fasciures greyish-white, body beneath greyish-white. Legs fuscous, more or less annulated with greyish, the femora woolly greyish beneath. FEMALE. UPPERSIDE, both wings with the blue coloration less resplendent. Forewing with the apex and outer margin more broadly blackish. Hindwing with a marginal row of blackish spots bordered with greyish, placed between the nervules, that at the anal angle transversely linear and angulated. UNDERSIDE, both wings as in the male, the ochraceous margin of the subanal spot larger and more diffused" (Distant, l. c.).

Lampides (Cupido) carulea, Druce, Proc. Zool. Soc. Lond., 1873, p. 349, n. 13, pl. xxxii, fig. 6, male. HABITAT: Borneo (Druce), Ceylon (Butler). EXPANSE: Male, 1.2 inches. DESCRIPTION: "MALE. UPPERSIDE, both wings bright morpho-blue, with the outer margins bordered with black; two minute black lines at the anal angle. UNDERSIDE, both wings pale brown, crossed by four whitish lines from the costal margin to the anal angle. Hindwing with a large orange spot at the anal angle, with a black spot in the centre." (Druce, l. c.). I have hardly any doubt in my own mind that the *carulea* of Druce, the *coruscans* of Moore, and the *kankana* of Distant (but not of Felder) represent but one species, which should be known by the first mentioned name, but until someone makes an actual comparison between the type specimens of all these species, the matter must remain in doubt.

736. *Lampides pseudelpis*, Butler.

L. pseudelpis, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. 1, p. 547, n. 9, pl. lxviii, figs. 9, male; 8, female (1877); id., Moore, Lep. Cey., vol. i, p. 95 (1881); *L. elpis*, var. *pseudelpis*, Distant, Rhop. Malay., p. 227, pl. 11, figs. 27, male; 28, female (1884).

HABITAT: Ceylon, Malacca, Java, Bantam.

EXPANSE: ♂, ♀, 1·5 inches.

DESCRIPTION: "Nearly allied to *L. elpis*, Godart, which it resembles above. MALE: UPPERSIDE, both wings more distinctly bluish-opaline. UNDERSIDE, both wings with the white transverse bands narrower, irregular and broken up. Hindwing with the large submarginal black spot less broadly encircled by ochreous" (Butler, l. c.)

"MALE. UPPERSIDE, both wings of a paler colour than in *L. elpis*, with a black marginal line. Hindwing with a whit inner marginal line only, no submarginal spots. UNDERSIDE, both wings with the bands narrower, more irregular and broken, the two marginal bands more sinuous, the anal black spot larger and less broadly bordered with ochreous." (Moore, l. c.)

"I cannot look upon this proposed species as exhibiting anything but a varietal character or form of *L. elpis*." (Distant, l. c.)

Mr. Distant also points out that Mr. Butler's figures of the species are inexact in some respects, as the female should exhibit a fuscous costal margin on the upperside of the forewing, whilst the ground-colour of the wings is too green in hue. Moreover, no tail to the hindwing is shown.

It is of course impossible to distinguish *L. pseudelpis*, Butler, from *L. elpis*, Godart, by the inexact figures and very insufficient diagnosis given by Mr. Butler. When new species are established on minute differences from already described species, it is of course imperatively necessary that minute specifications should be furnished: and the description (*e. g.*) given by Dr. Horsfield for *L. alianus*, Fabricius, *L. celeris*, Fabricius, and *L. elpis*, Godart, afford excellent models in this respect. Dr. Horsfield has pointed out that the arrangement of the four discal transverse white striz on the underside of the forewing "affords clear characters for a specific distinction;" also that "the species can only be clearly discriminated by the markings of the underside of the forewing, on which the specific character will eventually be founded," and it is chiefly these characters that we must look for establishing a distinction between *L. pseudelpis* and *L. elpis*, as between other closely allied forms in this group.

The species as described by Mr. Butler and identified by Mr. Moore appears to occur typically in Ceylon, where however it appears with *L. elpis*, *L. alianus*, and *L. coruscans*, and may have originated in hybridation. I have before me five males and three females from Ceylon, which on the upperside are probably indistinguishable from many specimens of typical *L. elpis*; but on the underside the characters above-mentioned furnish means of distinguishing the one from the other. Confining attention to the four discal striz of the forewing, and designating them as nos. 1, 2, 3 and 4—no. 1 being nearest to the base of the wing—it is seen that in *L. elpis* nos. 1 and 2 are parallel to each other, arising some distance from the costa and passing in a slight curve across the disc terminating on, or close to, the inner margin; while nos. 3 and 4, also parallel to one another, arise from the costa, but reach only half way across the wing; these last consist of short linear fragments, the last fragment of no. 4 ends on the third median nervule, while no. 3 has an additional fragment extending from the third to the second median nervule; this appears sometimes as a continuation of no. 3 stria, or being much broken from that stria and placed nearer the exterior margin, it appears as common to both nos. 3 and 4, and thus looks like the lower stroke of a Y, of which those two striz are the upper arms.

The arrangement in *L. elpis* is very different from that in *L. alianus*; and in the form, now under consideration, *L. pseudelpis*, the arrangement is somewhat intermediate between these two older species. In *L. pseudelpis* striz nos. 1 and 2 are arranged as in *L. elpis*, arising some distance from the costa and gently curving transversely to the inner margin; and nos. 3 and 4 arise as in *L. elpis* from the costa and are at first parallel one to the other. But

no. 4 instead of ending on the third, reaches the second median nervule, and no. 3 on reaching the third median nervule, is suddenly deflected towards no. 2, into which it runs: so that the lower part of no. 2 looks like the lower stroke of a Y, of which its own upper part and No. 3 are the upper arms. This arrangement of nos. 2 and 3 somewhat resembles that in many specimens of *L. albanus*, so that *L. pseudelpis* seems intermediate between *L. elpis* and *L. albanus*, although on the upperside it cannot be distinguished from some forms of the former.

737. *Lampides subdita*, Moore.

L. subdita, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 41 (1886).

HABITAT: Mergui, December and March.

EXPANSE: ♂, ♀, 1.0 to 1.4 inches.

DESCRIPTION: "MALE UPPERSIDE, both wings entirely pale glossy purpurascens lavender-blue as in *L. pseudelpis*, Butler, and without any marginal border. * UNDERSIDE, both wings darker brown, the white lines all conspicuously narrower. Forewing with the discal lines almost straight, continuous, the middle line entire from end to end, whereas in *L. pseudelpis* they are disposed irregularly, and the upper portions are in a curved series, the area between the two marginal lunular lines is also blacker. Hindwing with the basal and discal lines also more linearly disposed, beyond which are five very prominent black dentate submarginal spots bordered by the white lunules, the marginal spots also are black, the subanal black spot is only half the size, and its red bordering area much larger and of an oval shape. FEMALE UPPERSIDE both wings paler greyish blue. Forewing with a broad brown exterior band. Hindwing with brown anterior border, and a prominent row of black centred white spots bordered with brown. UNDERSIDE, both wings as in the male."

"Numerous specimens, all alike both on the upper and underside." (Moore, l. c.)

A very good and distinct species, which may at once be known on the underside of both wings by the two inner submarginal lines enclosing a series of fuscous spots, the innermost line highly lunular on the hindwing, and the subanal orange patch relatively to the other species of the genus of immense size. These distinctive characters are correlated with a very unusual arrangement of the four transverse discal stræ on the underside of the forewing which is quite unlike that of any other species of the group. Nos. 1 and 2 are short parallel lines arising at some distance from the costa and lying one on each side of the disco-cellular nervules and having a common posterior segment from the second median nervule to the inner margin; this appears as the lower stroke of a Y, of which stræ nos. 1 and 2 are the upper arms: sometimes no. 1 is continued uninterruptedly to the inner margin, and no. 2 is then short: no. 3 arising, not on, but near the costa, traverses the wing to the inner margin, being however dislocated sometimes more or less at the second median nervule. no. 4 is parallel to the upper part of no. 3, ending at the second median nervule. Altogether this is one of the most distinct species of the group.

Another species of the *L. elpis* group has been described as below† from Malacca. It is based on a single female in the collection of Dr O. Staudinger. The markings of the underside are precisely similar to those of *L. elpis*, Godart; but the upperside differs from all the specimens of that species I have seen in having the blue coloration very much restricted, confined to the basal half of the forewing, and to an even smaller area in the hindwing.

* This is incorrect, it has quite as distinct an outer black border as has *L. pseudelpis*.

† *Lampides abduci*, Distant, Rhop. Malay, p. 456, n. 6, pl. xiv fig. 32, female (1886). HABITAT: Malacca. EXPANSE, Female, 1.2 inches. DESCRIPTION: "FEMALE UPPERSIDE, both wings pale cerulean blue. Forewing with the costal and outer margins—the last very broadly—pale brownish, the outer margin with some indistinct greyish fasciæ. Hindwing shaded with pale brownish as on the forewing, but the outer margin broader, with some black spots with bluish margins at the anal angle. UNDERSIDE, both wings pale greyish brown. Forewing with two greyish-white fasciæ crossing the wing at the end of the cell commencing at the subcostal nervure, followed by two shorter fasciæ commencing near the lower subcostal nervule and terminating on the third and second median nervules respectively, and two submarginal and a marginal fasciæ of the same colour. Hindwing crossed by greyish fasciæ, a black marginal spot inwardly margined with ochraceous between the second and first median nervules, and a small patch of greenish scales preceded by ochraceous at the anal angle. Body and legs more or less concolorous with the wings." (Distant, l. c.)

738. *Lampides alianus*, Fabricius.

Heperia alianus, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 280, n. 79 (1793); *Polyommatus alianus*, Godart, Enc. Méth., vol. ix, p. 654, n. 123 (1823); *Lycana alianus*, Horsfield, Cat. Lep. E. I. C., p. 73, n. 9, pl. iv, figs. 1, larva; 1a, pupa (1828); *Lampides alianus*, Butler, Cat. Fab. Lep. B. M., p. 166, n. 16 (1859); id., Moore, Lep. Cey., vol. 1, p. 94, pl. xxxviii, figs. 3, male; 3a, female; 3b, larva and pupa (1881); id., Distant, Rhop. Malay., p. 228, n. 2, pl. xxi, fig. 18, male; pl. xxii, fig. 19, male variety (1884); *Papilio alexis*, Stoll (nec Scopoli), Supplement Cramer's Pap. Ex., vol. v, pl. xxxviii, figs. 3, 3C, male (1790); *Lycana alexis*, Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. i, p. 25, n. 20, pl. i, figs. 1, larva; 1a, pupa (1857); idem, id., Proc. Zool. Soc. Lond., 1865, p. 773; *Lampides alexis*, id., l. c., 1878, p. 833; id., Swinhoe, l. c., 1885, p. 131, n. 49; *Lampides zethus*, Hübner, Verz. bek. Schmett., p. 70, n. 684 (1816); *Cupido agnata*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 4, pl. xvi, figs. 2, 4, male; 3, female; *Lampides agnata*, Butler, Trans. Linn. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 8 (1877); *Lampides alianus*, var. *n. agnata*, Distant, Rhop. Malay., p. 228 (1884); *Lampides confervenda*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 25 (1886); *Platycus malaccanus*, Röber, Iris, vol. i, p. 57, pl. iv, fig. 3, male (1886).

HABITAT: Throughout India at all elevations not exceeding about 5,000 feet except in the desert regions of Sind, and also throughout Ceylon, in the Andaman Isles, Assam, Burma, Siam, Malay Peninsula, Java, Bantam, Borneo, Timor Laut, Philippines,

EXPANSE: ♂, ♀, 1.3 to 1.6 inches.

Dry-season form.

DESCRIPTION: "MALE. UPSERIDE, both wings milk-white. Forewing with a narrow brown posterior border. Hindwing surrounded by a delicate black striga, interior to which is an obscure interrupted brown band, in which the large ocellate spot at the anal angle distinctly shows itself. UNDERSIDE, both wings grayish-brown, varying in intensity of tint [often of a ferruginous or chestnut-brown tint] In both wings the ground-colour assumes, in some individuals, between the transverse strigæ a deeper tint, so that these appear to be marked with broad, transverse, brown bands; but this is by no means uniform: some of our specimens have these brown bands very distinct, in others [probably specimens of the wet-season broods] equally well-preserved, the ground-colour is uniform, and the white transverse strigæ preserve the character above described. Forewing with seven, hindwing with nine, transverse white strigæ, of which three are marginal, extending uniformly through both wings. Forewing, the remaining strigæ are discoidal [discal], regularly parallel, with a slight inclination to the posterior apical [anal] angle, arranged in two pairs, the first, on the disc, short and separated from the costa by three dots, disposed as the points of a triangle; the second extending nearly half across the wing, each with a dot at its contact with the costa slightly deviating from the regular course. On reaching the middle of the wing these strigæ are all abruptly terminated at one of the longitudinal nerves, and each pair is continued by a single streak to the posterior margin; in consequence the strigæ appear divided, resembling in some cases two successive figures of the form of the letter Y. The posterior portions of the strigæ have undefined, spreading edges, and in many individuals the whole of the posterior portion of the wing is milky and discoloured. Of the three marginal strigæ, the interior is broadest and most prominent; reaching the posterior part of the wing, its inner edge expands in a diffuse radiant border, gradually mingling itself with the cloudy milky surface; the intermediate one is undulating, and composed of a connected series of lunules directed outwards; the exterior striga is continued, regular, parallel with the margin, and exteriorly defined by a narrow black line, beyond which is a grayish cilia. Hindwing, these marginal strigæ preserve the same character, until they are partially interrupted in the anal region; the surface of the wing is further marked with six transverse strigæ, disposed in three pairs, one near the base, a second across the disc, a third intermediate between this and the marginal ones; the basal strigæ are delicate and regularly transverse, with a slight curve at the interior margin; the discoidal pair is not continued quite to the exterior margin, but has, at its commencement, a short intermediate lineola; at the interior margin it is inflected inwards, so as to form, abruptly, an acute angle; the third pair extends only half across the wing, having a short intermediate lineola at its posterior termination. In the anal region there are three ocellated spots; the largest, situated on the posterior margin just without the caudal

* I retain the better-known name *alianus* for this species, though *alexis* is prior in date.

appendage, is ovate, bounded internally by a narrow orange crescent, and externally by a streak covered with greenish-silvery irrorations; at its internal edge is a reniform spot, intensely black towards the anal angle, surmounted by a silvery lunule and a small orange crescent, and touching at the extreme anal angle a minute, dark-coloured, blind ocellus. *Tail* lengthened, slender, brown above, and white underneath and at the extremity. *Antenna* black and regularly fasciated with white externally. *Body* pale blue above white underneath. **FEMALE.** **UPPERSIDE,** *both wings* milk-white, with a broad brown border, which in the *forewing* is simple and more extended near the tip, in the *hindwing* waving internally and bearing a series of brown spots of a deeper tint towards the anal extremity; these spots are enclosed individually by two white crescents applied to each other from the opposite sides and forming a white ring, exterior to which is a deep brown marginal streak, terminated by a grayish-brown *culta*. **UNDERSIDE,** *both wings* as in the male. (Horsfield, l. c.)

Wet-season form.

DESCRIPTION: **MALE and FEMALE.** **UNDERSIDE,** *both wings* differ in the ground-colour being darker, more inclined to plumbeous, instead of being "grayish-brown" as in the dry-season form; all the white strigæ prominent and well-defined, their edges never blurred; the space between the strigæ on the disc always concolorous with the rest of the wing, never forming distinct darker bands. *Forewing* with the ground colour always uniform, never becoming white on the disc towards the anal angle. *Hindwing* with the anal ocelli large, well-formed, and prominently inwardly crowned with orange.

The arrangement of the four "characteristic" strigæ is clearly and minutely given by Horsfield, and it would appear that in all his Javan specimens strigæ nos. 1 and 3 (which alone completely traverse the disc) were distinct; and that "in some cases" their inferior portions appeared as the straight strokes of Ys, of which their upper portions formed the left arms. This arrangement of Ys is common also in Indian specimens, but, as it is not universal, it may be well to state the arrangement of these strigæ in a form which will embrace all individuals that have come under my notice.

All four strigæ start from the costa, or, more exactly, are only separated from the costa by small dots. Nos. 1 and 3 extend across the wing to the inner margin; but nos. 2 and 4 are short and reach only the third and second median nervules respectively. Sometimes each of the strigæ nos. 1 and 3 is continued uninterruptedly across the disc, in which case the four strigæ are parallel and nowhere in contact. But often they are dislocated, no 1 on the median nervule, no 3 on its first branch: sometimes one only is dislocated, sometimes both; in the latter case the result is that two Ys are formed, as noted by Horsfield; in the former case, while nos. 1 and 4 remain as two independent more or less uniform and continuous strigæ, nos. 2 and 3 form a Y intermediate between them. This last is the usual arrangement in the dry-season forms, which present the dark bands between nos. 1 and 2 and nos. 3 and 4 as one very distinct and broad-stroked Y occupying the whole disc of the wing. All these modifications of the strigæ occur in the same broods, and in series of insects caught at the same place and at the same time. But whatever be the dislocations, all four strigæ arise on the costa, nos. 1 and 3 are continued almost to the inner margin, no 2 extends only to the third, and no 4 to the second median nervule.

It will be observed that Horsfield in his ample and minute description includes in the one species *alianus*, insects with uniform tint of under surface crossed by distinct white strigæ, and also those with ground tint below variegated and clouded with white and traversed by broad dark bands (*alexis*). But Messrs. Butler and Swinhoe consider the latter form of *L. alianus* to represent a distinct species, and apply Stoll's name *alexis* to it. Messrs. Godart, Felder, Horsfield, Moore, and Distant agree with me in considering these two species synonymous, and I have cleared up the matter a little by indicating that typical *alexis* represents the dry-season and typical *alianus* the wet-season form of one species. The dry-season form of *L. alianus* is immensely variable; in the description of it given above I have indicated its main characteristics only. Mr. Butler has quite recently described one of the varieties of the

dry-season form of *L. alianus* as a distinct species as below, calling it *L. conferranda*.* I also give descriptions of *L. agnata*, Druce, and *L. malaccanus*, Röber, which appear to represent other varietal forms, and are treated as such by Mr. Distant.

LARVA when full-fed just half an inch in length, of a dull reddish-green colour, thickly shagreened with minute white tubercles, scarcely if at all hairy; the head pale ochreous, entirely hidden beneath the second segment, the segments increasing in width to about the fifth, the two anal segments slightly decreasing and above flattened, especially the thirteenth; the erectile organs very small; a dorsal pulsating line somewhat darker than the rest of the body, a subdorsal series of pale green oblique streaks, one on each segment on each side from the third to the eleventh segment inclusive; no other conspicuous markings. Dr. Forel has identified the ant that attends the larva in Calcutta as *Camponotus mitis*, Smith (= *bacchus*, Smith, = *ventralis*, Smith). Dr. G. King identifies the plant on which the larva feeds in Calcutta as *Heynea trijuga*, Roxburgh. **PUPA** of the usual lycaenid shape, quite smooth, neither hairy nor pitted, pale ochreous-greenish, the upper portions of the abdominal segments darker, covered throughout with coarse rounded blackish spots placed irregularly; a dorsal and subdorsal series of similar but larger spots or blotches placed regularly. Head bluntly rounded, thorax slightly humped and constricted posteriorly, end of the abdomen rounded.

* *Lampides conferranda*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 25 (1886). **HABITAT**: Deyra Doon, Poona, Calcutta, Sylhet, Assam, Sheencigar, and thirty miles above Mandalay, Upper Burma, December. **EXPANSE**: 1.75 inches. **DESCRIPTION**: "Hitherto confounded with *L. alexis*, Stoll, but readily to be distinguished from the fact that it is of a sandy instead of greyish-brown colour on the underside, and that the whole of the bands are shifted backwards towards the base, leaving a wide pale band between the dorsal bands and the external border; the submarginal series of spots ill-defined; none of the markings distinctly white-edged, and the subanal ocellus of the hindwing very small."

"This is the commonest form of the *L. alexis* group. Though hitherto regarded as a variety of *L. alexis*, it has as much claim to specific rank as any of the species of the *L. elpis* group,* the differences being precisely of the same character as in the variously named forms of that group." (Butler, l. c.)

This is a very common dry-season form of *L. alianus*, which, according to Colonel Lang, "occurs plentifully in September and October on the lower slopes and in the valleys below Naini Tal, from 4,000 feet elevation downwards to 1,000 feet, but it is mixed with others having different tints (brown, ferruginous or castaneous) of the underside, and it occurs on exactly the same ground as the previous wet-season broods of typical *L. alianus*, *L. alexis* (with *L. conferranda*, which is only one of the many forms which cannot be separated off into definite or distinct varieties even) is only the (dry) seasonal form of typical *L. alianus*."

* This is probably a slip for "*L. alianus* group," as *L. alexis* has nothing to do with *L. elpis*, and is, in fact, placed by Mr. Moore in his Lep. Cey. as a synonym of *L. alianus*.

Lampides (Cypides) agnata, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 4, pl. xvi, figs. 2, 4, male; 3, female; *Lampides agnata*, Butler, Trans. Entom. Soc. Lond., Zoology, second series, vol. i, p. 547, n. 3 (1877); *L. alianus*, var. n., *agnata*, Distant, Rhop. Malay, p. 228 (1884). **HABITAT**: Malacca, Singapore; Nakhonchaisi, Siam. **EXPANSE**: Male and female, 1.5 inches. **DESCRIPTION**: "MALE. UPRISIDE, both wings bluish-white. Forewing with the outer margin slightly dusky. UNDERSIDE, both wings pale greyish-brown, forewing crossed beyond the cell with six irregular white bands. Hindwing with ely, the first two close to the base; two black spots near the anal angle surrounded with orange. FEMALE. UPRISIDE, both wings bluish-white. Forewing with the apical half pale brown, broadest at the costal margin. Hindwing from the base to the apex brown, extending to the middle of the cell, outer margin brown, crossed by a band of whitish lunular markings. UNDERSIDE, both wings as in the male." (Druce, l. c.)

"This proposed species, judging from Mr. Druce's figures, appears to be a variety of *L. alianus*, differing from the typical form on the underside of the forewing, by the arrangement of the greyish linear larvae, of which the innermost of the first and second pairs appear to be—beneath the cellular area—more irregularly deflected and waved." (Distant, l. c.)

Lampides malaccanus, Röber, *Plebeius malaccanus*, Röber, Isis, vol. i, p. 57, pl. iv, fig. 3, male (1886). **HABITAT**: Perak, Philippines. **EXPANSE**: Male, 1.3 inches. **DESCRIPTION**: "MALE. UPRISIDE, both wings light blue with a more saturated exterior margin (Malacca), whitish-blue (Philippines); the white markings of the underside showing through, slightly on the forewing, more so on the hindwing; the exterior margin in the blue specimens dark brown, on the hindwing with an interrupted white marginal line, and a few dark spots on the exterior margin. In the light specimens the markings of the underside show through more, and on this account on the exterior margin of the forewing there are some dark spots and a dark band, as also on the exterior margin of the hindwing is a row of dark light-encircled spots, and a dark undulating band; the costal and inner margins of the hindwing whitish; *ely* with a white tip. UNDERSIDE, both wings grey-brown with white markings, on the exterior margin somewhat darker; the large black spot between the first and second median nervules of the hindwing very broadly encircled with orange and dusted with metallic green; the small black spot at the anal angle dusted with metallic green and encircled with yellow. Thorax clothed with blue hairs; abdomen above grey-brown, below and *pelus* whitish; antenna black, ringed with white below; *palpi* black above, white below; *leg* white; *tarsi* ringed with black." (Röber, l. c.)

Judging from the figure, this species has the outer black margin to the forewing on the upperside a little less wide than in typical *L. alianus*, Fabricius, rather broader than in *L. pura*, Moore. On the underside of the forewing the characteristic striae are arranged as follows:—No. 1 is continuous from the costa to the inner margin; no. 2 is short, extending from the costa to the median nervule; no. 3 is long, reaches from the costa to the inner margin, and is deflected inwardly somewhat (though not broken) below the median nervule, forming a Y with no. 2, this stria forming the left upper arm of the Y; no. 4 stria is short, extends from the costa to the second median nervule. This species may, perhaps, be known by the large size of the black spot broadly encircled with orange in the first median interspace of the hindwing on the underside, which, as figured, appears to be nearly as large as the ocellus in *L. subdita*, Moore.

In Java Dr. Horsfield records the larva as feeding on *Butea frondosa*. From Ceylon Mr. Moore describes the larva as "onisciform; green or violet-brown, with a dark dorsal and lateral black lines. Pupa pale violet-brown."

Little need be said about the occurrence of this common butterfly in India. Colonel Lang records it from Almora, 5,500 feet, which is probably the highest altitude it reaches in the Himalayas. It is found almost everywhere except in the desert regions of Sind, and is probably common everywhere where it occurs. Mr. G. F. Hampson notes that in the Nilgiri Hills "the dry-season brood of *L. alianus*, Fabricius, is much paler than the wet-season brood." Colonel Lang writes on the same subject "How very different are the two broods, the summer and autumn, wet and dry season! They look marvellously distinct both on the wing and in the cabinet."

739. *Lampides pura*, Moore. (FRONTISPIECE, FIG. 132 ♀, DRY-SEASON FORM).

L. pura, Moore, Journ. Linn. Soc. Lond., Zoology, vol. xxi, p. 41 (1886).

HABITAT: Assam; Chittagong Hill Tracts; Mergui, December to March.

EXPANSE: ♂, ♀, 1'12 to 1'50 inches.

Wet-season form.

DESCRIPTION: "Allied to *L. alianus*, Fabricius, *L. celerio*, Fabricius, and *L. agnata*, Druce. MALE. UPPERSIDE, both wings of the same pale-bluish tint as in the above-named species. Forewing entirely without any trace of a black border to the exterior margin, whereas in each of the above species there is a decided black marginal band decreasing in width from the apex. UNDERSIDE, both wings of a similar colour as in the above species, but of a darker tint than in *L. alianus*; markings also similar, but more strongly defined. Forewing in several specimens without a marginal border. Hindwing, subanal spot with a much broader red inner border. FEMALE. UPPERSIDE, forewing with the marginal black band narrower than in *L. alianus*, the inner edge of the band curved like that in *L. alexis*, Stoll. Hindwing with a narrower series of marginal lunular spots." (Moore, l. c.)

In the Indian Museum, Calcutta, are three males and one female of this species, which include the type specimens, from Mergui. I also possess a single male, taken at Terria Ghât in Assam in the autumn, which agrees with the Mergui specimens. Mr. Moore says that this species has no trace of a black border to the outer margin of the forewing on the upperside of the male. There is, however, a very distinct anteciliary black thread, and this thread, being of equal width throughout both wings, not expanded into a more or less broad black border in the forewing, constitutes the best character, as far as I can see, for distinguishing *L. pura*. I do not understand Mr. Moore's remark that the underside of the forewing in several specimens has no marginal border. The five Mergui specimens I have before me agree precisely in markings on the underside, one with another, and also with many specimens of *L. alianus*. The arrangement of the four characteristic striae is similar to that of many *L. alianus*. In all the five specimens above mentioned the arrangement is identical. Nos. 1 and 3 cross the wing uninterruptedly from the costa to the inner margin, no. 3 is very slightly dislocated on the second median nervule, the lower portion more or less slightly shifted towards the base: nos. 2 and 4 end on the third and second median nervules respectively; and, as no. 2 is inclined slightly outwards towards no. 3, it meets or nearly meets this stria at the point of dislocation, thus forming with it a distinct Y, intermediate between nos. 1 and 4. It remains to be seen, from larger series collected in and near Mergui, if the Tenasserim form is perfectly constant in this arrangement of the four striae, nos. 2 and 3 forming a distinct Y between the straight nos. 1 and 4 striae, and also in the extreme fineness and uniformity of width of the marginal border of the forewing on the upperside in the male. These at the best are but very slight characters by which to separate this as a distinct form from the variable *L. alianus*.

Dry-season form.

In the Indian Museum, Calcutta, are six males and two females of a *Lampides* taken in November and January in the Chittagong Hill Tracts by the late Mr. H. M. Parish, which I

believe to be the dry-season form of *L. pura*. It should be noted, however, that the Mergui specimens were all taken during the cold-season, when the weather is usually quite dry over the greater portion of Northern India. There may, however, have been a spell of wet weather at some period during the earlier life of these specimens which caused the imagines to assume the garb of the wet-season form, or, still more probably, Burma often being very wet during the winter, there may in Mergui be no dry-season form at all of *L. pura*. These Chittagong specimens differ in the usual way from the wet-season form; the ground-colour of the underside of both wings is cinnamon-brown, except a discal suffused white patch on the forewing, stripe nos. 1 and 2, also nos. 3 and 4, of the forewing are entirely filled in with deeper brown, and all four stripe together forming a single large Y across the disc of the wing. In the hindwing the basal and discal stripe are all filled in with dark brown in the same way, three broad dark brown bands across the wing therefore resulting. The orange spot at the anal angle of the hindwing also is very small, in some specimens quite obsolete. The upperside of the males of these six Chittagong specimens has the fine black marginal thread characteristic of *L. pura*, and by which alone I can recognise them as appertaining to that species, but in all other respects they are the ordinary dry-season form of *L. albanus*.

The figure shews both sides of a female specimen of the dry-season form of this species taken in the Chittagong Hill Tracts, and now in the collection of the Indian Museum, Calcutta.

740. *Lampides kinkurka*, Felder.

Lycæna kinkurka, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 107 (1862); idem *Id.*, Reise Novara, Lep., vol. ii, p. 273, n. 336, pl. xxxiv, figs. 24, 25, female (1865); *Lampides kinkurka*, Moore, Proc. Zool. Soc. Lond., 1877, p. 588; *L. albanus*, Wood Mason and de Nicville (*nee* Fabricius), Journ. A. S. B., vol. i, pt. 2, p. 234, n. 30 (1881); idem, *Id.*, *Id.*, vol. ii, pt. 2, p. 17, n. 32 (1882).

HABITAT: Kar Nicobar (Felder), Nankowii (Moore), Kamorta, Teresa, Trinkut, Nankowri, Katschall, and Great Nicobar (*de Roepstorff* and *Man*)—all in the Nicobar Isles.

EXPANSE: ♂, ♀, 1'1 to 1'5 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, both wings opalescent whitish, powdered with brownish towards the base, a blackish streak before the cilia. Forewing with the outer border somewhat fuscous, broader at the apex, divided by whitish diffused increasing spots and a submarginal line. Hindwing with external lunules somewhat fuscous in a bent series, and others submarginal smoky blackish-fuscous (the last but two of these larger, the last but one bent, transversely protracted). UNDERSIDE, both wings whitish, tinted brownish beyond the middle, a streak before the cilia and a series of small submarginal spots fuscous. Forewing with two subcostal spots, a broken discal fasciole, and another beyond it cigar-shaped and an exterior fascia confluent formed of lunules. Hindwing with a basal fasciole, a discal fascia, strongly broken at the trunks of the nervules hindwardly inflected and with a fasciole adherent beyond it of the ground-colour, partly circled with fuscous and bordered with whitish, inconspicuous, an external bent fascia of fuscous lunules covered over by a largish posterior spot, with a yellowish encircling lunule, and another minute subanal inwardly circled with luteous black, slightly sprinkled with metallic."

"This splendid species is allied to *L. alexis*, Stoll (= *albanus*, Fabricius)." (Felder, l. c. in Reise Novara.)

L. kinkurka is by far the commonest species of the genus occurring in the Nicobars. The male on the upperside of the forewing has a somewhat indistinct and inwardly diffused submarginal very pale dusky band, then a band of lunules of the ground-colour, or of a rather lighter tint, then a series of blackish oval spots between the veins, outwardly defined by a white, and then a black marginal thread. The hindwing is similarly marked, but the oval blackish spots are larger and darker. The disposition of the white lines on the underside of the forewing is most irregular, but they are never arranged as in *L. kankana*, Felder, or *L. kondalana*, Felder. The four characteristic stripe may be described thus:—nos. 1 and 2 (as in the *elpis* group) arise far from the costa on the subcostal nervure; while nos. 3 and 4 arise almost on the costa itself. Nos. 1 and 4 are short, no. 1 ending on the median nervure,

and no. 4 on the second median nervule. Sometimes no. 2 is short instead of no. 1, and ends on the median nervule, in which case no. 1 is long and is continued almost to the inner margin, and all four striz are parallel. No. 3 extends continuously nearly to the inner margin, though it is slightly dislocated where it crosses the second median nervule, the dislocation tending to shift the lower portion inwardly towards the base, and this inward shifting is sometimes carried to quite a considerable extent. No. 2 is carried continuously almost to the inner margin; but it also is liable to considerable dislocation, the lower portion being shifted towards the base, so that sometimes it almost reaches no. 1 stria. This arrangement presents the appearance of a Y, more or less perfect or distorted, formed by nos. 1 and 2 striz; which is followed by a long continuous stria across the wing (no. 3), and a short one beyond (no. 4). When the location of the Y is perfect it is as in *L. subdita*, Moore; while *L. alianus*, Fabricius (usually), *L. pseudelpis*, Butler, and *L. pura*, Moore, have the Y intermediate between striz nos. 1 and 4; and *L. elpis*, Godart, *L. kondulana*, Felder, and *L. hankena*, Felder, have no appearance of a Y at all.

Mr. Wood-Mason and I have twice recorded *L. alianus* from the Nicobars; this is incorrect, however, the specimens belonged to the present species. Mr. Moore has had equal difficulty in recognising the species, as he has identified several specimens of it for the Indian Museum, Calcutta, as *L. hankena*, an apparently distinct species or geographical race occurring in Kar Nicobar only, and having a distinct striation on the underside.

Mr. E. H. Man and the late Mr. A. R. de Roepstorff have both sent numerous specimens of a *Lampides* from the island of Great Nicobar, which differ from specimens of *L. hankurka* from the other islands of the Nicobars enumerated above in being larger, and in having the upperside of both sexes leaden (sooty) instead of opalescent whitish. The situation of the underside agrees with that of typical *L. hankurka*, and I do not consider this local race as of sufficient distinctness to deserve a specific name to be applied to it.

Another species of this group which has been described as below* from the Malay Peninsula, is probably only a variety of *L. alianus*, though it is kept distinct by Mr. Distant. The characteristic striz are arranged as follows:—Nos. 1 and 2 striz form a Y, of which the two arms are, of course, the short upper portions of the striz; no. 3 stria is continuous from the costa to the inner margin; no. 4 stria is short, and runs from the costa to the second median nervule. The subanal spot to the hindwing is as in typical *L. alianus*.

741. *Lampides kondulana*, Felder.

Lycena kondulana, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 484, n. 118 (1862); idem, id., Reise Novara, Lep., vol. ii, p. 272, n. 332 pl. xxxiv, fig. 6, male (1865); *Lampides kondulana*, Moore, Proc. Zool. Soc. Lond., 1877, p. 586.

HABITAT: Kondul Island (Felder), Nankowri (de Roepstorff), both of the Nicobars; and Andamans (Moore).

EXPANSE: ♂, ♀, 1'4 to 1'5 inches.

DESCRIPTION: * MALE. UPPERSIDE, both wings bluish-whitish, slightly shining, a fuscous striga before the cilia. Forewing with diffused fuscous striolæ before the margin, outwardly resting on an obsolete white line. Hindwing with rather larger fuscous spots before the margin, outwardly margined with whitish, the last but one the largest of all, and darker; the anal one transversely lengthened, inwardly also margined with whitish and with

* *Lampides optimus*, Rober. *Plebeius optimus*, Rober, Iris, vol. i, p. 56, pl. iv, fig. 16, female (1886); id., Distant, Rhop. Malay, p. 456, n. 5, woodcut n. 127, female (1886). HABITAT: Perak, East Celebes (Rober), Borneo (Distant). EXPANSE: Male and female, 1'2 to 1'35 inches. DESCRIPTION: "MALE. UPPERSIDE, both wings whitish-blue, the white markings of the underside showing through. Forewing with the exterior margin grayish-brown. Hindwing with a darker marginal line, inner margin whitish, and with white cilia, darker at the nervules; tail with a white tip. UNDERSIDE, both wings light sawn-gray with white markings. Forewing with the inner margin whitish. Hindwing with the black spot between the first and second median nervules enclosed in broad orange, at the sides dusted with metallic green; at the anal angle a smaller blacker spot enclosed in orange. FEMALE. UPPERSIDE, forewing with a broad dark grey exterior margin. Hindwing with a series of darker white-encircled spots on the exterior margin. UNDERSIDE, both wings as in the male. Thorax bluish; abdomen dark above, whitish below; pectus the same; antennæ black, ringed with white; palpi black above, white below; legs black outside, white within; feet ringed with black." (Rober, l. c.)

another of the same colour of the same form joined to it. **UNDERSIDE**, both wings pale hoary-brownish, with a fuscous marginal streak and a silvery line before the cilia, two fasciæ before the margin which are both fuscous bordered with whitish, and macular (getting wider on the hindwing). **Forewing** with a discal fascia between the internal nervure and the upper discoidal nervule, and beyond it a fasciole which is unequal-sided and chain-like of the ground-colour, laterally bordered with fuscous and margined with whitish. **Hindwing** with a basal abbreviated fascia slightly broken at the subcostal nervure, an internal spot, a discal fascia, terminated at the subcostal nervure hindwardly bent, and another exterior abbreviated very strongly broken at the first subcostal nervule, hindwardly emitting a minute whitish spot of the same colour, an awl-shaped spot at the third median nervule, a larger hinder lunule encircling a large black cuneate-oval spot, most sparingly sprinkled outwardly with metallic, and a small subanal spot, placed outwardly on a rounded black spot, inwardly sprinkled with metallic-greenish, pale yellowish."

"This splendid species is most nearly allied to the preceding [*L. kankena*, Felder], but is distinguished from it by the production of the apex of the forewing, by the slightness of the curvature of the outer border of the hindwing, and the straightness of the margin between the first subcostal and the second median nervules of the hindwing." (Felder, l.c., in *Reise Novara*.)

In the Indian Museum, Calcutta, are a pair only of this species taken by the late Mr. F. A. de Roepstorff, on the island of Nankowri in the Nicobars. The male is easily distinguished from all other species known to me by having short black streaks (striolæ) between the veins just within the anteciliary fine black thread on the upperside of the forewing, from which black thread they are separated by an obsolete white line, on which (as Felder states) they are seated: on the hindwing these striolæ are produced in an increasing series of spots, the largest of which is round and in the first median interspace, and beyond which are two black transverse lines, one above the other, from the first median nervule to the abdominal margin. On the underside also the markings are very distinctive, there being a pair of strictly continuous white lines (characteristic striæ nos. 1 and 2) on the forewing from the subcostal to the submedian nervure enclosing the disco-cellular nervules, with a shorter pair of lines beyond (nos. 3 and 4), the inner line from the subcostal nervure to the second median nervule, the outer line also from the subcostal nervure, but terminating on the third median nervule. These are the four 'characteristic' striæ, and it will be seen that they agree almost exactly with those of *L. elpis*, and are quite distinct from those of *L. alianus*. These insects, in fact, have the general aspect of *L. alianus* above and of *L. elpis* below. They are of the 'wet-season' coloration. The female differs from the male on the upperside of the forewing in having a broad outer dusky margin, which widens out very much at the apex. The hindwing has the marginal series of black spots rather larger than in the male, with an inner submarginal lunular blackish band, which also is faintly present in the male. Underside marked like the male. I may add that the female has been identified by Mr. Moore, and also by Herr A. F. Rogenhofer, of the Vienna Natural History Museum, who has compared the specimen with Felder's type. Mr. Moore also identifies the male as *L. kondulana*, and both sexes agree with Felder's figure in the arrangement of the four white discal lines on the underside of the forewing, which is a very notable distinctive character of the species, and serves to distinguish it from the other Nicobar form *L. tinkurka*, which has an entirely different arrangement of the characteristic striæ: while *L. kankena* appears to have the same arrangement as *L. kondulana*, from which it differs only in the absence on the upperside of the above-noted dark striolæ on the outer margin of the forewing of the male. *L. kondulana* and *L. kankena* may be geographical varieties, the former perhaps is restricted to the islands of Nankowri and Kondul, while the latter occurs only on Kar Nicobar. Mr. Moore records this species from the Andamans (Port Blair), but this is probably a mistake, as he does not give *L. alianus*, Fabricius, from thence, though undoubtedly it occurs very commonly.

742. *Lampides kankena*, Felder.

Lycena kankena, Felder, Verh. zool.-bot. Gesellsch. Wien, vol. xii, p. 481, n. 206 (1862); *idem*, id., Reise Novara, Lep., vol. ii, p. 270, n. 331, pl. xxxiv, fig. 37, male (1863).

HABITAT: Kar Nicobar (Felder).

EXPANS: ♂, 1.35 inches.

DESCRIPTION: "MALE. UPPERSIDE, both wings pale silvery-blue, with a fuscous striga before the cilia. Forewing with the apical border darker. Hindwing with an obsolete whitish submarginal streak, an anal spot transversely protracted and two small strigæ set on it fuscous circled with whitish. UNDERSIDE, both wings pale hoary-fuscous, a silvery line before the cilia, interrupted at the veins in the hindwing, before it a fuscous streak, inwardly defined with a whitish streak (macular on the hindwing). Forewing with an abbreviated discal fascia and a fasciole beyond it, emitting a litura of the ground-colour, laterally circled with fuscous and whitish, a pair of submarginal fasciæ with connate spots a little darker than the ground-colour, circled with whitish. Hindwing with a basal fascia strongly broken at the subcostal nervure, an internal spot, a discal fascia, ceasing at the second subcostal nervule, hindwardly bent, and another beyond it, abbreviated broader, terminated at the third median nervule and there emitting a whitish litura, strongly broken at the subcostal nervules, all of the ground-colour, circled with fuscous and whitish, two submarginal fasciæ, with spots darker than the ground-colour, and circled with whitish, connate, a large hinder black spot, inwardly encircled with a luteous lunule, outwardly dotted with metallic and a minute subanal black spot, bordered inwardly with luteous, outwardly bordered with metallic."

"Is similar to *L. nemea*, Felder, from Amboina, in the coloration of the upperside, but has more resemblance to *L. amphissa*, Felder, from Batjan, in the shape of the wings. The underside, however, is very different from that of either of these species." (Felder, l. c. in Reise Novara.)

Dr. Felder only figures the underside of this species; and in this the white lines of the forewing appear to be arranged much as in *L. kondulana*, Felder, the pair on either side of the disco-cellular nervules (characteristic strigæ nos. 1 and 2) being continued in a straight line to the submedian nervule; no. 3 strigæ reaches the second and no. 4 strigæ the third median nervule; and these two latter strigæ are parallel to one another. The description of the fasciæ of the underside of the forewing is generally as in that of *L. kondulana*, Felder. I have not seen any specimens which exactly fit Felder's description; and although Mr. Moore identified for the Indian Museum, Calcutta, as "probably *L. kankena*," insects taken by the late Mr. F. A. de Roepstorff and Mr. E. H. Man on Great Nicobar, these cannot, however, belong to this species owing to a distinct striation below, and are considered by me to be a local race of *L. kinkunka*, Felder. *L. kankena* may be confined to Kar Nicobar Island, taking there the place of *L. kondulana*, Felder, to which it is very closely allied, and from which it may be difficult to separate it as a distinct species. I should add that *L. nemea* is figured with the coloration of the *elpis* group, and, as *L. kankena* is said to be coloured in the male on the upperside as in *L. nemea*, it may not belong to this group at all, though the words "pale silvery-blue" would seem to show that it belongs to the *alianus* group.

I append a description of *L. marakata*, Doherty, MS.* from Perak. It is the only species of the genus which is green instead of blue on the upperside.

* *Lampides marakata*, n. sp., Doherty, MS. HABITAT: Padang Rangas, Perak. EXPANS: Not given. DESCRIPTION: "MALE. UPPERSIDE, forewing with the base and disc from the inner margin to just above the discoidal cell light green of a peculiar shade and a satiny lustre, the margin very widely and evenly and the costa more narrowly black, occupying more than half of the surface, more or less sprinkled with green scales near the green area. Cilia obscurely whitish at tip. Hindwing with the basal third partially, the cell wholly green; a slender purplish marginal line interrupted at the ends of the veins, a similar submarginal line extending from the second median nervule to the abdominal margin, enclosing with the other a very dark band. UNDERSIDE, both wings uniform grey, marked very much as in *L. alianus*, Fabricius. Forewing with the transverse white markings broken, the lower ones placed below the disco-cellular band as if in continuation of them. Hindwing with a large orange ocellus with a black and metallic centre; a black marginal and a white submarginal line. Cilia white at base, grey at tip."

This species has, like the others of the genus, its characteristic form of prehensores. Seen from the side the clasp is divided into two longitudinal horizontal lobes, the lower thick at base then narrowed, the end

The third subgroup comprises four genera which practically agree in the disposition of the veins of the wings; so that once more general *facies* has to be relied on as a distinguishing character. The first three genera, *Catochrysope*, Boisduval, *Tarucus*, Moore, and *Castalius*, Hubner, have the first subcostal nervule of the forewing impinging on, or touching, the costal nervure; but though the two veins run side by side for some little distance, they are not anastomosed into a single vein as in the first subgroup of the *Polyommatus* group. In these three genera these two veins are sometimes slightly separated from one another; in the fourth genus, *Polyommatus*, Latreille, the veins are well separated. The first genus, *Catochrysope*, has the males of different shades of blue or purple on the upperside; the underside is brown or drab, the forewing has no basal markings, but bears a disco-cellular spot, a discal catenulated band, and the usual marginal markings. The hindwing has always two prominent black dots just below the costa, sometimes with additional similar basal dots, one or two prominent black orange-crowned, silver-speckled, subanal spots, and whitish catenulated markings as in the forewing. The females are blackish on the upperside, with the usual discal metallic blue areas. The genus has a very wide range in southern Asia, occurring throughout the Malay Archipelago, and extending to Australia, and to the South Sea Islands. It probably also occurs in Africa. The next genus, *Tarucus*, has the markings of the underside quite different from those of *Catochrysope*, the base of the forewing is marked with streaks and spots, there are no catenulated markings, but the entire surface of both wings is covered with black, brown, or rusty-red dashes and spots. It occurs in Southern Europe, Africa, Asia Minor, Persia, almost throughout India, and Ceylon, and one species is found in Java. The next genus, *Castalius*, has the markings on the underside of the typical species (*C. rosimon*, Fabricius) not unlike those of *Tarucus*, but fewer in number and larger in size; the other species of the genus have still fewer markings, which are often concentrated into broad bands and patches. The genus does not occur in Europe, but is found in Africa, throughout India, Ceylon, and the Malay Peninsula and Archipelago. The last genus, *Polyommatus*, is a very small one, and the typical species (*P. bettius*, Linnaeus) has a style of markings on the underside which is quite peculiar to itself, consisting of very numerous closely-placed short pale ochreous bands, with two prominent black silver-spangled subanal spots to the hindwing. It has an immense range in the old world, occurring in Europe, Africa, Asia, Australia, and many oceanic islands. It does not seem to have reached America yet, but sooner or later it is almost sure to do so. The males of all the species of all these genera entirely lack secondary sexual characters. Both sexes have a filamentous tail to the hindwing from the termination of the first median nervule.

Genus 121.—*Catochrysope*, Boisduval (PLATE XXVII).

Catochrysope, Boisduval, Voy. Astrolabe, Lep., pl. 1, p. 87 (1832); id., Moore, Lep. Cey., p. 90 (1887); id., Distant, Rhop. Malay., p. 223 (1884).

"FOREWING, triangular; *costal nervure* extending half the wing, bent upwards to the costa near the end, *first subcostal nervule* emitted at nearly one half before the end of the cell, curved upwards and slightly touching the costal nervure; *second subcostal* emitted at one third, *third subcostal* at one eighth before the end of the cell, *fourth subcostal* at two-thirds from the base of the third and terminating at the apex, *fifth subcostal* from the end of the cell, [*middle and lower*] *disco-cellular nervules* slightly concave, [*lower*] *discoidal nervule* from their middle; *discoidal cell* narrower than in the genus *Nacaduon*, Moore, extending to half length of the wing; *second median nervule* from immediately before the end of the cell, *first median* at one-half before the end. HINDWING, short, triangularly-oval; *abdominal margin* long, furnished with a single

strongly clavate and truncate, with a sharp projection from the upper side. Upper lobe very slender, somewhat shorter than the other, sinuous, strongly bent inwards at the tip, so as to meet that of the opposite clasp."

"Female unknown. A single male taken in deep forest near Padang Kangas, Perak, at 2,000 feet elevation. The substitution of green for the usual light blue tints of allied species and the very broad black margin, giving it the air of a female, secure for this butterfly quite a unique position in the genus." (Doherty, MS.)

slender tail [at the termination of the first median nervule]; costal nervure much arched; first subcostal nervule slightly curved, emitted at one-fourth before the end of the discoidal cell; disco-cellular nervules obliquely recurved; discoidal nervule from their middle; discoidal cell broad; third and second median nervules from the end of the cell, first median at one-half before the end; submedian nervure straight, internal nervure recurved. BODY, moderate; palpi porrect, second joint laxly squamose, third joint long, slender; legs slender; antennæ with the club rather short, grooved; eyes hairy in *C. strabo*, Fabricius, naked in *C. cnejus*, Fabricius, and *C. pandava*, Horsfield. "Type, *C. strabo*, Fabricius." (Moore, l. c)

The costal nervure of the forewing terminates just opposite the apex of the discoidal cell; the first subcostal nervule is bent upwards just beyond its base, and runs parallel with and touches the costal nervule for a short distance but does not completely anastomose with it; the origin of the second subcostal is nearer the base of the first subcostal than to the base of the upper discoidal; the third subcostal nervule is emitted from the subcostal nervure just midway between the base of the upper discoidal and the apex of the wing; the upper discoidal originates from the subcostal nervure before the apex of the cell, consequently there is no upper disco-cellular nervule; the middle and lower disco-cellulars of equal length, the lower discoidal from their point of junction. In the hindwing the upper disco-cellular is outwardly oblique, the lower perpendicular. In *C. pandava*, Horsfield, the first subcostal nervule of the forewing is quite free from the costal nervure and does not touch it as in the typical species.

I can recognise three distinct and well-marked species in this genus. *C. strabo*, Fabricius, is lilac-blue in the male on the upperside in typical specimens, but it occasionally has a "sport" or aberration which is greyish silvery-blue (*lithargyria*). *C. cnejus*, Fabricius, is equally distinct, the male of a deeper colour on the upperside, more purple than blue, with two instead of one black marginal ocellus at the anal angle of the hindwing. This appears to be a very variable species, Messrs. Butler and Swinhoe recognising six distinct forms of it, none of which are in my opinion worthy of specific rank. Lastly, *C. pandava*, Horsfield, is quite distinct, but has a well-marked seasonal form occurring in the dry weather, which at once reminds one of the corresponding form of *Chilades latus*, Cramer, in that the hindwing on the underside has all the discal markings run together into a large dusky patch.

The transformations of all three species are known, but of two only have they been described. The larvæ and the pupæ are of the usual lycænid form; all the larvæ have the extensile organs on the twelfth segment, and are attended by ants.

I do not know of the occurrence of any species of the genus in Europe, but it is found in Africa, near Aden, in Persia, and throughout the Indian region, the Malay Peninsula and Archipelago, in China, in Australia, and in the South Sea Islands.

Key to the Indian species of *Catochrysops*.

- A. Both sexes with a distinct small dusky costal spot between disco-cellular and discal bands on underside of forewing; eyes hairy.
 - a. Male, upperside lilac-blue.
 - 743. *C. STRABO*, India, Ceylon, Malaya, Andaman and Nicobar Isles, China, Australia.
 - b. Male, upperside greyish silvery-blue, female unknown.
 - 744. *C. LITHARGYRIA*, Ceylon, Andaman Isles, Burma, Upper Assam, Philippines.
- B. Both sexes with no dusky costal spot on underside of forewing; eyes smooth.
 - a. Male, upperside with two nearly equal-sized black spots at anal angle of hindwing.
 - 745. *C. CNEJUS*, India, Ceylon, Andaman and Nicobar Isles, Malaya, China, Australia, South Sea Islands.
 - 746. *C. THESEUS*, Bombay.
 - 747. *C. ELLA*, Western India, Punjab, Central India.
 - 748. *C. CONTRACTA*, Kandahar, Karachi, Kutch, Madras.
 - 749. *C. HAPALINA*, Punjab, Deccan, Central India.
 - φ. Male, upperside with one large black spot at anal angle of hindwing.
 - 750. *C. PANDAVA*, India, Ceylon, Andaman and Nicobar Isles, Burma, Malay Peninsula, Java, Bantam.
 - 751. *C. NICOLA*, Bombay.

743. *Otochrysops strabo*, Fabricius.

Hesperia strabo, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 287, n. 202 (1793); *Polymenatus strabo*, Godart, Enc. Méth., vol. ix, p. 656, n. 134 (1833); *Catochrysops strabo*, Boldsval, Voy. Ast., Lep., pt. 1, p. 88, n. 2 (1832); id., Moore, Lep. Cey., vol. i, p. 91, pl. xxxvii, figs. 2, male 2a, female (1881); idem, id., Proc. Zool. Soc. Lond., 1882, p. 246; id., Distant, Rhop. Malay., p. 224, n. 1, pl. xxi, figs. 8, male; 14, female (1884); *Lampides strabo*, Butler, Cat. Fab. Lep. B. M., p. 165, n. 14 (1869); *Cupido strabo*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 3; *Lycana strabo*, Snellen, Tijds. voor Ent., vol. xix, p. 152, n. 46 (1876); *Lycana kandarpa*, Horsfield, Cat. Lep. E. I. C., p. 82, n. 17 (1849); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 773; *Lampides kandarpa*, Semper, Journ. Mus. Godeff., vol. xiv, p. 158, n. 62 (1879); *Lycana asoka*, Kollar in Hölzel's Kaschmir, vol. iv, pt. 2, p. 419, n. 3 (1848); *L. didda*, id., l. c., p. 420, n. 5; *L. platissa*, Herrich-Schäffer, Stett. Ent. Zeit., vol. xxx, p. 74, n. 31, pl. iv, fig. 20, female (1869); idem, l. c., Ex. Schmett., vol. ii, fig. 122, female (1869).

HABITAT: Throughout India, Ceylon, Burma, Malay Peninsula, Siam, Nias, Andaman and Nicobar Isles, Java, Borneo, Celebes, Philippine Isles, Formosa, Hainan, Australia.

EXPANSE: ♂, 1 10 to 1 50; ♀, 1 10 to 1 45 inches.

DESCRIPTION: "MALE. UPPERSIDE, both wings pale violet-blue, with a rich silvery reflexion, assuming in a certain light a dusky grayish shade, the colour being uniformly distributed over the whole surface; surrounded with a delicate black marginal thread, and an extreme grayish *clia* Hintwing marked exteriorly to the caudal appendage with an ocellate spot of a deep black colour, surrounded anteriorly with a pale blue lunule; a very faint transverse brown marginal bar, bordered with white, occupies in some individuals the space between this ocellus and the extreme anal angle. UNDERSIDE, both wings pale whitish-gray, and marked with catenulated bands, consisting each of two parallel undulated marginal threads of a brilliant white, including a broader fascia of a somewhat deeper shade than the ground-colour; three white strige pass in both wings parallel with the posterior [outer] margin, the exterior one is obsolete and bounded by a brown marginal thread, the two next are waving, and include two undulated bands of the ground-colour resembling the adjoining catenulated bands. Forewing with a short fascia placed transversely on the disc, the next [fascia] posteriorly extends entirely across the surface; the exterior [costal] margin has in the middle a minute ocellate spot with a white annulet. Hindwing with three similar fasciae disposed in succession transversely on the disc, the anterior one is composed of two narrow interrupted portions, the second is short and stands transversely on the disc, the third is irregular and extends in an interrupted course entirely across the wing, and in the anal region is suddenly inflected and composed of short arcs; the exterior margin has, near the costa, two ocelli, separated by a small intervening space; in the anal region there are four ocelli, the exterior one, near the caudal appendage, is very large, nearly round, of a deep black colour, abruptly truncated and ornamented posteriorly with a streak of golden irrorations, and surmounted interiorly and at the sides with a large rufous crescent; the remaining ocelli are narrow and obscure, the interior one consists of a small dot at the extreme anal angle, and the intermediate ones are ovate and united into a reniform spot, the penultimate one being ornamented with a streak of metallic irrorations; along their inner edge passes a white streak, and interiorly of this a faint waving rufous band. The thorax and abdomen agree above and underneath, in colour with the wings; the eyes are bordered, the tail is tipped with white, and the antennae are marked with white bands. FEMALE. UPSIDE, both wings have a broad brown border, the blue colour being brighter than in the male, covered with a silvery gloss, confined to the base in the hindwing, but spreading also over the disc in the forewing. Hindwing, the margin bears a series of ocellate spots, increasing in intensity of tint towards the caudal appendage, where the ocellus is intensely black and surrounded interiorly by a rufous crescent, the remaining ocelli have narrow white semilunar borders within and transverse marginal lines without; a series of lunular white marks passes regularly along the inner border of the marginal ocelli, and a few obscure spots form an irregular arch across the disc." UNDERSIDE, both wings as in the male. (Horsfield, l. c.)

The transformations of this species do not appear to have been recorded. In the plains I have found it most commonly about plants of dhál, and I think it probable that the larva feeds on that

plant. Mr W. C. Taylor informs me that it feeds in Orissa on a plant named *Dolichos catjang*, Roxburgh, which is also one of the food-plants of *C. cnejus*, Fabricius.

Little need be said regarding the distribution of this common species as it seems to occur almost everywhere from the lower and outer ranges of the Himalayas to Ceylon and Singapore, and in the Andaman and Nicobar Isles. Throughout its Indian range *C. strabo* appears to be very constant in coloration and markings if the next species is considered to be distinct. Mr W. H. Irvine writes to me that at Bholahât, Malda, he once took *C. strabo* coupled with *C. cnejus*, Fabricius.

744. *Catochrysops lithargyria*, Moore

Lampides lithargyria, Moore, Ann and Mag of Nat Hist, fourth series vol xx, p 40 (1877) idem, *Id.*, Lep. Cey, vol 1, p 91 (1881), id., Butler, Ann and Mag of Nat Hist, fifth series, vol xvi, p 336, n 73 (1885), id., Elwes and de Nicéville Journ. A S B, vol iv pt 2 p 420, n 97 (1886)

HABITAT: Ceylon (Moore); near Assam (Butler); Tavoy (Elwes and de Nicéville); Andaman Isles; Philippines.

EXPANSE: ♂, 12 to 15 inches.

DESCRIPTION: "MALE UPPERSIDE, both wings greyish silvery-blue, with a very narrow marginal black border. Hindwing with two triangular spots from the anal angle. Cilia white, with dusky marginal inner line. UNDERSIDE, both wings white. Forewing with a broad greyish-brown spot at the end of the cell, a transverse discal maculated band with a contiguous spot at the upper end, a narrower submarginal band, and very indistinct marginal lunules. Hindwing with two prominent black costal spots, two greyish-brown subbasal spots, a broad spot at the end of the cell, a curved discal macular band, a marginal series of lunular spots enclosed by a broad dentate band, the penultimate spot being black and bordered above with ochreous."

"Allied to *L. landarpha*, Horsfield [= *C. strabo*, Fabricius], also from Ceylon, but of an entirely different colour above and beneath, and the markings of the underside all much broader. Also allied to *L. [= C.] platissa*, Herrich-Schäffer, from Australia" (Moore, l. c. In Ann and Mag of Nat Hist.) Herr Georg Semper no doubt correctly states that the last-named species is also a synonym of *C. strabo*.

"Is this really a species distinct from *C. strabo*, Fabricius? It only differs in the shade of colour of the upperside *C. strabo* being 'lilac-blue,' *C. lithargyria* 'greyish silvery-blue.' The two always appear to occur together, and the female of the latter species is even now undescribed." (Elwes and de Nicéville, l. c.)

I have but little to say regarding this species, the specific distinctness of which is, in my opinion, very questionable. Besides the localities given for it above, the Indian Museum, Calcutta, has two specimens from Sibsagar in Upper Assam, one from Mergui taken by Dr J. Anderson in December, and one from the Andaman Isles. I possess a single example from the Philippines sent me by Herr Semper.

745. *Catochrysops cnejus*, Fabricius.

Hesperia cnejus, Fabricius, Ent Syst. Suppl., p 430, n 100 101 (1798), *Polymmatia cnejus*, Godart, Enc Méth., vol ix, p 657 n 135 (1823), *Lycaena cnejus*, Horsfield Cat Lep E. I C., p 85, n 18 (1820); id., Moore, Proc Zool Soc Lond., 1865 p 773, id., Herrich-Schäffer, Ex. Schmett., vol ii, fig 120, female (1869), *Lampides cnejus*, Butler, Cat Fab Lep B M., p 165, n 13 (1869) id., Semper, Journ. Mus. Godefr. vol xiv, p 158, n 61 (1879), *Cupido cnejus* Druce, Proc Zool Soc. Lond., 1873, p 348, n 7; *Catochrysops cnejus*, Moore, Lep Cey., vol 1, p 92 (1881) id., Butler, Proc. Zool Soc Lond., 1881, p 605, n 15 id., Moore, l. c., 1882, p 246 id., Distant, Rhop Malay., p 225, n 2, pl xxi, fig. 2, male (1884); p 456, n 2, pl xlv, fig 15, female (1886) *C. cnejus*, Doherty, Journ. A S B, vol iv, pt. 2, p 133, n 170 (1886); *Lycaena pandia*, Kollar, Hügel's Kaschnir, vol iv, pt 2, p 418, n 2 (1848), *L. patala*, id., l. c., p. 419, n. 4, *Lampides patala*, Butler, Trans. Linn Soc Lond., Zoology, second series, vol i, p 347, n. 3 (1877) *Catochrysops patala*, id., Proc. Zool Soc. Lond., 1883, p 148 n 14, id., Swinhoe, l. c., 1885, p 131, n 53, idem, id., l. c., 1886, p 426, n. 38, *Lycaena samos*, Herrich-Schäffer, Stett. Ent. Zeit., vol. xxx, p. 37, n. 30, pl iv, fig 18, female, also page 138 (1869)

HABITAT. Throughout India, Ceylon, Burma, Malay Peninsula, Nias, Andaman and Nicobar Isles, Sumatra, Java, Borneo, Celebes, Philippines, China, Australia, South Sea Islands.

EXPANSE: ♂, ♀, 3 to 7½ inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* uniformly pale violet-blue, with a narrow grayish-brown posterior [outer] border, and two oblong black spots in the anal region, within [on either side of] the caudal appendage. UNDERSIDE, *both wings* gray with a faint Isabella-yellow shade; marked on the disc with a short transverse stigma, which in the hindwing is slightly curved. *Forewing* has three ranges of catenulated bands of a brown colour, of which the two exterior are parallel with and adjoining the posterior margin, being confined by the marginal stigmæ; the third, in which the catenulated character is more distinctly exhibited, is intermediate between the marginal series and the disc; this is continued through the *hindwing*, where it is more curved and somewhat irregular and inflected in its course; in the marginal series of ocellate spots, the interior ones form two strongly-marked anal ocelli; these are regularly round, nearly equal in size and brilliancy of tint, intensely black, encircled by a pale orange iris, bordered internally by a ring of yellow metallic irrorations, which is partially interrupted at the internal edge: the hindwing has further, four ocellate spots of an intense black colour with white iris, three of these are placed in a transverse series at the base, and a third, somewhat larger and more vivid, in the middle of the anterior margin close to the costa. *Thorax* above has a bluish cast and is covered with delicate hairs; *abdomen* brown, underneath agrees in colour with the wings; *thorax* underneath and *legs* covered with a delicate pure white down; *antennæ* banded with white. FEMALE. UPPERSIDE, *both wings* with a deep brown border, a light blue tint with a bright silvery reflexion is, in the hindwing confined to the base, in the forewing expanded to the disc, but entirely evanescent in a certain position towards the light. *Hindwing*, posterior border bearing a series of dark ocellate spots, of which two, at the anal angle, are of a deeper tint and surrounded internally with bright rufous crescents; the penultimate ocellus exceeds the last in size and brilliancy of colour; all these ocelli are abruptly truncated behind, and the exterior ones are surrounded internally with narrow white crescents; a row of angular or wedge-shaped marks of a brilliant white, having the points directed towards the disc, passes along the inner edge of the marginal series. UNDERSIDE, *both wings* like the male. *Cilia* throughout in both sexes gray." (Horsfield, l. c.)

LARVA when full-fed about half an inch in length, green, of the usual lycaenid shape, the head small, black, shining, retractile as usual. Colour of body pale green, with darker green or reddish dorsal and subdorsal lines, often with short oblique lines one on each segment on each side between the dorsal and subdorsal lines, the latter coalesced into a broad band between the eleventh and last segments. The entire surface of the body covered with minute white tubercles, there are also a few scattered white hairs. The segmental constrictions shallow. Spiracles black. Extensile organs on the twelfth segment small. The larva is broader than high in its highest part, increasing in width to the fourth segment, from thence to the flattened anal segment of about uniform width. Bred by me in Calcutta on *Phaseolus trilobus*, Linnæus. Mr. W. C. Taylor reports that the larva feeds in Orissa on *Dolichos catjang*, Roxburgh. Dr. A. Forel identifies the ant which attends the larva in Calcutta as *Camponotus rubripes*, Drury (= *sylvaticus*, Fabricius), subspecies *compressus*, Fabricius. PUPA very pale green, the abdominal segments somewhat opaque, of the usual lycaenid shape, no distinctive structure or markings. Headcase somewhat square, thorax slightly humped, slightly constricted before the first abdominal segment, a dark dorsal line extending the whole length, spiracles black, entire surface smooth, not hairy. Mrs. Wyllie has furnished me with the following description of the preparatory stages of *C. cneus*. "Larva one half to three quarters of an inch long, onisciform, flattened at the tail and narrower; yellowish-green in colour, with brownish-red spots down the dorsal line. Some of the larvæ are darker red-brown, and some uniform pale green. The food-plant is an edible bean growing in the rains, with clusters of bluish flowers, vernacular names, Bargara (Uriah), Barbati (Bengali), the *Dolichos catjang* of Roxburgh. Larvæ are attended by black ants of the larger species, in the same way as are the larvæ of *Tarucus theophrastus*, Fabricius. Both species have the power of

emitting some agreeable odour or juice from the small movable horns situated on the upper-side near the tail. These horns are capable of being projected and retracted at pleasure. As I have found the pupæ of *T. theophrastus* in ants' nests, probably the pupæ of *C. cnejus* are also guarded by the ants in their nests, as well as attached to the undersides of leaves. The larvæ of *C. cnejus* are found entirely on the young green clusters of buds and flowers."

As little need be said about the general distribution of this species as about that of the species which precedes it. It is perhaps not quite as common where it occurs, but has a slightly greater recorded range, as Herr Semper states that it is found on Kajoa, one of the South Sea Islands. In my opinion it is subject to great seasonal and climatic variation, so much so indeed, that Mr. Butler admits five distinct species of the group, none of which are, in my opinion, entitled to specific rank.

The next four species, all of which have been described by Mr. Butler and Colonel Swinhoe, in whose writings alone references to them are to be found, are in my opinion either "sports," seasonal forms, or inconstant local races of *C. cnejus*. I think the table below of the specimens of these species from various localities in Colonel Swinhoe's collection will help to show this; in the one locality of Mhow, he gives five distinct species of this group, in Karachi, four, and in Poona and Bombay, three—

Mhow	<i>cnejus</i>	<i>patala</i> ,	<i>ella</i> .	<i>contracta</i>	<i>hapalina</i>	
Karachi	<i>cnejus</i>	<i>patala</i>	<i>ella</i> .	<i>contracta</i>		
Poona	<i>cnejus</i>	<i>patala</i> .			<i>hapalina</i> .	
Hubb river			<i>ella</i> .	<i>contracta</i> .		
Bombay	<i>cnejus</i> .	<i>patala</i> .				<i>thesus</i> .
Hyderabad			<i>ella</i>	<i>contracta</i> ,		
Kadgodri	<i>cnejus</i>			<i>contracta</i>		

I have given below the original descriptions of all these species with the exception of *C. patala*, Kollar, with regard to which I follow Mr. Distant, who places it as a synonym of *C. cnejus*. As so many species of this group have of late been discriminated, it is probably impossible without examining the type specimen to say exactly what *C. patala* is.

746 *Catochrysops thesus*, Swinhoe.

C. thesus, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 131, n. 55, pl. ix, fig. 8, male.

HABITAT: Bombay, October.

EXPANSE: ♂, 1.2 inches.

DESCRIPTION: "MALE UPPERSIDE, both wings like *C. cnejus*, Fabricius. Cilia grey on the forewing. UNDERSIDE, both wings greyish-white, markings greyish-brown, marginal line brown, submarginal and discal macular lines arranged as in *C. hapalina*, Butler, but the markings broader, the spots running into each other forming two almost clear bands; all the markings surrounded by whitish. Hindwing with a subcostal black spot near the base and another below it, a lunular streak at the end of the cell, two black spots on an orange ground near the anal angle; border greyish-brown; submarginal and discal whorl of markings as in *C. cnejus*, but darker, broader, and running into each other, almost forming bands; the discal band commencing with a longitudinal subcostal deep black streak." (Swinhoe, l. c.)

I have not seen this species, and strongly suspect that it is an aberration or sport.

747. *Catochrysops ella*, Butler.

¹ *C. ella*, Butler, Proc. Zool. Soc. Lond., 1881, p. 606, n. 17; idem, id., l. c., 1886, p. 365, n. 37; id., Swinhoe, l. c., 1884, p. 506, n. 21, idem, id., 1886, p. 426, n. 40, idem, id., Jour. Bomb. Nat. Hist. Soc., vol. II, p. 273, n. 22 (1887).

HABITAT: Karachi, December and January; Campbellpore, 21st November, 1885 (Butler); a few specimens taken at Karachi in December and January; Mhow, September to November; Karachi common (Swinhoe).

EXPANSE: ♂, .83; ♀, 1.0 inch.

DESCRIPTION: "Allied to *C. cnejus*, Fabricius, but with the coloration of the wings on the underside more like *C. pandava*, Horsfield. MALE. UPPERSIDE, both wings lilac,

greenish at the base, with a broad dark brown border twice as wide at apex as towards the external angle. *Hindwing* with a black marginal line and a submarginal series of six ocelloid spots, less distinct in the male than in the female, the first indistinct, the three following brown with white borders, the fifth large, black, with the border white externally and orange internally, anal spot bifid, black with white border; *tail* black tipped with white. **UNDERSIDE**, both wings brownish-grey, with the spots arranged as in *C. cnejus*, but broader, less prominent; the submarginal spots relieved internally by a rather broad brown border, beyond which is a diffused discal white streak or band; the black ocelli towards the anal angle vary in extensity, and sometimes are almost wholly lost, as in the male before me. **FEMALE**. **UPPERSIDE**, both wings lilac, greenish at the base, with a blackish marginal line and indistinct ocelloid submarginal spots. *Hindwing* as in the male, but the submarginal series of six ocelloid spots more distinct than in the male, the first indistinct. **UNDERSIDE**, both wings as in the male. *Cilia* white throughout in both sexes." (*Butler*, l. c. in *Proc. Zool. Soc. Lond.*, 1881). From *C. hapalina*, *Butler*, it is at once distinguished by "its brighter colouring above and smoky-grey underside" (*Butler*, l. c. in *Proc. Zool. Soc. Lond.*, 1886).

"*C. ella* is a brilliantly blue species, with a broad black border to the forewing in the male; it can readily be recognised from its vague resemblance to some of the species of *Jamides* (*J. plato* [= *J. bochus*, Cramer] for instance); it is not quite so brilliantly coloured, though brighter than any other *Catochrysops*." (*Butler*, *Ann. and Mag. of Nat. Hist.*, sixth series, vol. i, p. 145 (1888).

I have rearranged the sentences of the original description, which is difficult to follow as it stands, the writer having mixed up the opposite sexes. In Colonel Swinhoe's collection are twenty-two specimens supposed to belong to this species, but they do not agree with the description of it. Mr. Butler says "male with a broad dark brown border twice as wide at apex as towards the external angle" This is quite inexplicable to me, the males of every species of this genus have a narrow outer black margin of equal width throughout to the forewing on the upperside, and I can only surmise that he has described two female specimens as male and female, unless Colonel Swinhoe's specimens are wrongly identified, or Mr. Butler had a butterfly before him when he wrote entirely different from every known species in the genus. Again, hindwing of the male on the upperside with "a submarginal series of six ocelloid spots" I can find no male *Catochrysops* exhibiting this feature, but the spots are more or less present in all females. Then, on the underside the spots are said to be broader than in *C. cnejus*. As *C. ella* is considerably smaller than typical *C. cnejus* the spots would naturally be smaller too. I cannot identify the species by the description, and can only surmise that it is a dwarfed form of *C. cnejus* occurring in the arid region of Sind and the Punjab. Colonel Swinhoe's specimens are from the Hubb river in Beluchistan, Karachi, Mhow, Madras, Bismuggur in Guzerat, and Hyderabad in Sind. They show the greatest variation, and, if all these species of *Catochrysops* allied to *cnejus* are to be kept distinct, certainly represent several more of such species.

748. *Catochrysops contracta*, Butler.

Lampides contracta, Butler, *Proc. Zool. Soc. Lond.*, 1880, p. 406 n. 10, pl. xxix, fig. 3, male; *Catochrysops contracta*? Butler, *Proc. Zool. Soc. Lond.*, 1881, p. 606, n. 16; id., Swinhoe, l. c. 1884, p. 506, n. 80.

HABITAT: Kandahar, Kutch (*Butler*); Karachi, Madras (*Swinhoe*).

EXPANSION: ♂, '92; ♀, '83 of 4-7 inch.

DESCRIPTION: "MALE. **UPPERSIDE**, glossy lilac, the body dark grey, with the head and sides of abdomen white, antennæ black annulated with white. Both wings with a slender black marginal line, *cilia* white; base of wings bluish; costal border of forewing pale bluish from the base to the end of the cell. *Hindwing* with a brownish costal border; two black spots, the inner one bifid, above the tail, succeeded by a slender white line; *tail* black tipped with white. **UNDERSIDE**, both wings very pale whitey-brown, with a white-bordered pale brown elongated spot at the end of each cell, followed by a discal series of similar spots, interrupted in the hindwing; a marginal series of white and brown ocelloid spots of the usual form.

Hindwing with three black spots above the tail at the anal angle, with two outer ones large, zoned with orange and varied with metallic golden green, the outermost spot extremely small; two subcostal black spots and a third within the cell. *Body* below white. **FEMALE.** **UPPERSIDE, both wings** pale brown, with a slender black marginal line followed by a brown line. *Cilia* white. *Forewing*, washed towards base of interno-median area with silvery blue. *Hindwing* with a series of six ocelloid spots close to outer margin—the first indistinct; the first four brown with white borders; the fifth large, black, with orange inner and white outer border; the sixth bifid, black with bluish inner and white outer border; *tail* black, tipped with white. *Body* browner than in the male. **UNDERSIDE** slightly browner than in the male; otherwise the same."

"Allied to *L. [=C.] cnejus*, Fabricius; but constantly smaller and of an entirely different colour, the upperside of the male being altogether blue and the underside whiter; the female is also paler; the pattern of the underside is very like that of *Lycena galba* [from Beirut, Persia] as figured by Lederer. Mr. Moore has a series of *L. contracta* from Kutch." (Butler, l. c.)

"Rare in Kandahar in May, very common in June, not so variable in size as *L. botica*, Linnaeus, and much smaller." (Roberts, l. c.)

"I believe this form to be only a seasonal variety of *C. cnejus*; but Mr. A. G. Butler, whose authority is much to be respected, thinks otherwise. I tried to breed them, but failed." (Swinhoe, l. c. in Proc. Zool. Soc. Lond., 1884, p. 506.)

"Common in Karachi from May to September. Butler's type came from Kandahar; the Karachi examples are identical with the Kandahar form." (Swinhoe, Journ. Bomb. N. H. Soc., vol. ii, p. 273, n. 21 (1887).)

In Colonel Swinhoe's collection are twenty-five specimens he identifies as this species from the Hubb River in Biluchistan, Karachi, Hyderabad in Sind, Mhow, and Kadgod. The males show great variation in the shade of coloration of the upperside, some being quite blue, others almost as violet-blue as in typical *C. cnejus*. In my opinion it is a variable dwarfed form of *C. cnejus* only, and not entitled to specific rank.

749. *Catochrysops hapalina*, Butler.

C. hapalina, Butler, Proc. Zool. Soc. Lond., 1883, p. 148, n. 15, pl. xxiv, figs 2, male; 3, female; id., Swinhoe, l. c., 1885, p. 131, n. 54; idem, id., l. c., 1886, p. 426, n. 39; id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 145, n. 41 (1888).

HABITAT: Mhow, September to January; Campbellpore, September and October; Poona, January to May; Khairabad, April; Hurripur, October.

EXPANSE: ♂, 1'05; ♀, 1'10 inches.

DESCRIPTION: "MALE. Allied to *C. ella*, Butler. **UPPERSIDE, both wings** pale lilac with strong pale golden-brown reflections, which sometimes almost overpower the lilac tint; base of wings blackish and blue; a slender blackish marginal line. *Cilia* white. *Hindwing* with a short and very slender black tail edged with white; two white-bordered black spots near the anal angle. *Body* blackish. **UNDERSIDE, both wings** greyish-white, with faint golden tints in certain lights; markings as in *C. patala*, Kollar, but less distinct; the two anal ocelli small, with no metallic scales in the type; the female, however, and such specimens of both sexes as are darker and bluer than the type above, have a metallic annulus of green on each ocellus; one male taken in January has this annulus of bright gold. **FEMALE.** **UPPERSIDE, both wings** blackish. *Forewing* with the exception of a broad apical patch tapering to beyond the middle of the costal border and a broad external border, suffused with bluish-lilac. *Hindwing* with the basal three-fifths, excepting towards the costa, of the same colour bounded externally by a narrow band of white spots; five submarginal black spots with white borders, those of the last two touched at the back with orange and bluish scales; otherwise almost exactly as in the male."

"This species may readily be distinguished from *C. ella* by the whiter tint of the underside, and the arrangement of the spots in the transverse series across the disc of the

forewing, which are placed end to end in a straight line instead of angle to angle; this arrangement brings the last of the series much nearer to the external angle."

"What I can only regard as a dwarfed form of this species occurs commonly at Mhow in December and January. Colonel Swinhoe, however, goes further than I do, and thinks that this and other allied forms are all seasonal varieties of *C. cnejus*; he probably means *C. patala*, since *C. cnejus* has the spots across the disc of the forewing below arranged angle to angle as in *C. ella*. Colonel Swinhoe further remarks that this small form (of *C. hapalina*) is as beautifully coloured as my *C. contracta*; and observes, 'Certainly the *C. contracta* from Madras are really very beautifully coloured; but then, again, the most beautifully coloured *C. cnejus* comes from Madras also—a moist part of India where all bluish-coloured butterflies are very beautiful'."

"*C. contracta*, as far as my knowledge goes, is confined to Kandahar: the markings of the underside are different in character from those of either the *C. patala* or *C. cnejus* groups; the spots of the discal series form a broken line, the upper part regular, the lower irregular. Unless such differences are admitted as of specific value, many of the best-established and hitherto universally admitted species will have to be united—an action to which few, if any, careful students of the Lepidoptera will give their sanction." (Butler, l. c.)

"Common at Mhow in December, but one or two found in October, November and January." (Swinhoe)

Major Yerbury records it as "common on babul-bushes in October" at Campbellpore. Mr. Butler records it from Khairabad, 11th April; Campbellpore, 11th September and 21st October; Hurripur, 14th October.

In Colonel Swinhoe's collection are twelve specimens he identifies as *C. hapalina*, from Alibagh and Mhow, and eight more which he considers to be a variety of that species from Mhow and Poona. The distinctions between this species and *C. cnejus* are so extremely slight that I cannot consider them to be of specific value: all the markings of the underside are less defined and duller and the insect is smaller, that is all, these are differences due to a dry climate, and not improbably are of a seasonal nature as well.

750 *Catochrysops pandava*, Horsfield

Lycana pandava, Horsfield, Cat. Lep. E. I. Co., p. 84, n. 19 (1829). *Catochrysops pandava*, Moore, Lep. Cey., vol. 1, p. 92, pl. xxxvii, fig. 1, male, 12, female, 10, larva and pupa (1881). id., Distant, Rhop. Malay, p. 225, n. 3, pl. xxi, fig. 17, male (1884). id., de Nicéville, Jour. A. S. B., vol. liv, pt. 2, p. 47, n. 74 (1885). *C. bengalia*, id., l. c., n. 75.

HABITAT: Himalayas Oudh, Bengal, Assam, Orissa, North Kanara, Bangalore, Pulni Hills, Ceylon, Andaman and Nicobar Isles, Burma, Malay Peninsula, Java, Bantam.

EXPANSE: ♂, ♀, '9 to 1'3 inches.

Wet-season form. (PLATE XXVII, FIG. 187 ♀).

DESCRIPTION: "MALE. UPPERSIDE, both wings bright lavender blue. Forewing with the outer margin fuscous. Hindwing with the costal margin fuscous, the outer margin with a series of blackish spots placed between the nervules, between which and the narrow black margin is a slightly undulating white line. Tail blackish, with its apex white. Cilia of both wings fuscous, the tips greyish-white. UNDERSIDE, both wings pale greyish-brown, with the following narrow greyish-white linear fuscous arranged in pairs, and between which the colour is distinctly darker:—forewing with two disco-cellular at the end of the cell, followed outwardly by two crossing the wing from near the fourth subcostal nervule, which are abruptly broken and deflected inwardly beneath both the second and first median nervules, two broad submarginal and one narrow marginal; hindwing with two disco-cellular at end of cell, two crossing wing broken and deflected at the lower subcostal and median nervules, two lunulated and submarginal, and one straight marginal, the last coalescing with the outer submarginal and thus enclosing a series of dark spots, a large black marginal spot with a few greenish scales between the second and first median nervules, and some smaller spots of the same colour at the anal angle;

these spots inwardly margined with reddish-ochraceous, which colour is also slightly continued between the third and second median nervules; five black spots surrounded with greyish-white, situated two between the costal [and subcostal] nervures, one in the cell, one between the bases of the first median nervure and the submedian nervure, and one (smaller) near the base of the abdominal margin. *Body and legs* more or less concolorous with the wings." (*Distant*, l. c.)

"FEMALE agrees in size and in the markings of the UPPERSIDE of both wings generally with *C. cnejus*, Fabricius; a slight difference is afforded by the interior anal ocellus of the hindwing, which here consists of two narrow, oblong, confluent spots, without rufous lunule, but bounded interiorly by an emarginate white line; the wedge-shaped marks along the inner border are replaced by a transverse series of lunules. UNDERSIDE, both wings yellowish-gray, with a very faint shade of brown; in the number and disposition of the markings it also resembles *C. cnejus*, but it possesses a distinguishing peculiarity in the brilliancy of the white marginal strigæ and in the greater breadth and deeper shade of the brown bands producing a striking contrast of colours: on the disc of both wings stands a short transverse stigma; behind this follows a broad catenulated band, regular in the forewing, with a few inflexions at the inner margin, but interrupted and irregularly curved in the hindwing; the marginal white strigæ, three in number, are strongly pronounced; the most exterior passes without undulations, in contact with the brown marginal thread, through, both wings; the two anterior strigæ are waving in the forewing and flexuose in the hindwing, embracing two series of catenulated bands, composed of oblong spots in the former, and of angular ones in the latter. Hindwing has the posterior margin adorned with two anal ocelli; the largest being placed exterior of the caudal appendage, and the other in the space towards the anal angle; an obscure black dot stands between them and another at the extreme angle of the wing; the exterior ocellus is covered internally by a very broad rufous arc, slightly notched at each side; a rufous streak is continued to the inner margin, being of a more saturated tint above the interior ocellus; a small exterior lunule of golden irrorations, adorns the large ocellus, and the small ocellus has on the margin an interrupted golden ring; there are five black spots encircled with white on the anterior portion of the hindwing; two of these, of a more saturated tint, stand in contact with the costa, the remaining form a transverse basal row, the penultimate spot being rather obsolete. The tail is slender and tipped with white; the antennæ brown with white rings and tip; the thorax and body are brown above and gray underneath, the former being covered with a bluish down and the latter annulated with white." (*Horsfield*, l. c.)

The figure shows both sides of a female specimen of the wet-season form from Bangalore in my collection.

Dry-season form. (PLATE XXVII, FIG. 188 ♀).

DESCRIPTION: "MALE. UPPERSIDE, both wings violet-blue. *Cilia* dusky. Forewing with the outer margin narrowly black. Hindwing with a marginal series of dusky oval spots, the third from the anal angle larger, black and round; an anteciliary black line; tail dusky with white tip. UNDERSIDE, both wings grey. *Cilia* grey spotted with dusky. Forewing with a white-bordered brownish spot closing the cell, a curved discal series of joined similar spots, two series of marginal lunules, a black anteciliary line. Hindwing with four subbasal dusky spots surrounded with white; a much curved discal series, the upper spot on the costa usually the most prominent, and a spot closing the cell; marginal lunules much as in the forewing, but more prominent; a small black spot faintly crowned with orange in the first median interspace, and three very minute anal ones beyond it, all four sometimes absent. In some specimens the discal series of spots on the forewing are much elongated towards the middle of the wing, and in all the specimens I have seen, except two from Sikkim, the spots on the disc and the one closing the cell of the hindwing have coalesced, forming an irregular brown patch in the middle of the wing, which patch sometimes reaches and includes the subbasal spots. FEMALE. UPPERSIDE, both wings shining iridescent violet-blue. Forewing with the apex widely and the outer margin decreasingly black. Hindwing with the costal margin dusky. Otherwise as the male."

"Near to *C. pandava*, Horsfield. Male smaller than that species, of a paler shade of blue; differing on the underside of the hindwing in the coalescing of the discal spots, and the anal spots being much smaller or absent altogether. The female on the upperside is of quite a different shade of blue, which colour reaches to the costa and is much nearer to the outer margin in the forewing, and covers all the hindwing except the costal margin. The marginal series of black spots are smaller, more regular in size, and the third from the anal angle not conspicuously crowned with orange as in *C. pandava*."

"I have taken numerous specimens of both sexes of this species in the cold weather in Calcutta, and the late Mr G. Nevill took it at Moiraka. It occurs also rarely in Sikkim." (*de Nicville*, l. c.) Since I described *C. bengalia*, I have carefully noted that it is only on the wing during the winter, and frequents the same Cicads which produce the wet season form later on. I have no hesitation therefore in sinking *C. bengalia* as a seasonal form of *C. pandava*.

The figure shews both sides of a female example of the dry season form in my collection from the Dehra Dun.

"**LARVA.** Onisciform; greenish or violet-brown above, with a dorsal darker brown line and white spots, and a yellow lateral line" (*Moore*, l. c.). "Feeds on *Cycadaceæ*" (*Thwaites*). Larva when full-grown a little over half an inch in length, of two distinct colours, some being bright green, others of a dark reddish-purple (vinous). They are of the usual lycænid shape: the head very small, black, shining, and hidden beneath the second segment, the third segment larger than the second, the other segments of about equal size, the anal segment flattened and rounded, divisions between the segments well marked. The larva throughout is very rough, widely pitted or depressed, and covered with very minute white tubercles bearing very short fine hairs, neither the hairs nor the tubercles being visible without a lens. The body at its highest and widest part is wider than high. It is extremely variable in markings, hardly any two being exactly alike, there is usually a dark dorsal, subdorsal and lateral line dividing the upper surface of the body into three equal areas, the dorsal and two subdorsal lines coalescing on the eleventh segment, and forming a broad band to the thirteenth. In some examples the divisions between the segments are marked with darker, and there is a subdorsal series of oblique dark lines one on each segment between the dorsal and subdorsal lines. The underside of the body and legs seem to be always pale green. The erectile organs on the twelfth segment very small. Feeds in Calcutta on *Cycas revoluta*. In Calcutta three species of ants attend this larva, which Professor Forel has identified for me as *Leptothorax longicornis*, Latreille, *Monomorium specularis*, Mayr, and *Crematogaster*, n. sp.? "**PUPA.** Violet-brown, thick, head truncate." (*Moore*, l. c.) Pupa. Of the usual lycænid form, quite smooth, more or less fuscous, with a darker dorsal and subdorsal line, head-case somewhat square, thorax slightly humped and constricted posteriorly, spiracles pale. Though the larvæ swarm in April and May in Calcutta on the cultivated Cycads in gardens, eating the hardly-opened shoots or fronds, thereby utterly destroying the appearance of the plant for the year, I have never succeeded in finding the pupa on the plants, and can only conclude that the ants drive the full-grown larvæ down the stems of the plants into their nests, where the larvæ undergo their transformations. As far as I know, the Cycads are always cultivated garden plants in Calcutta, and I am not aware of any other plant on which *C. pandava* feeds; though it must I think eat other things, as in Sikkim it is a very common species at low elevations, and I have never seen a Cycad there.

C. pandava is a much rarer species usually than either *C. strabo* or *C. cneus*, owing I fancy to the usual scarcity of its food-plant, though where the latter occurs, the butterflies often swarm. It has also not such a wide range as those species, and does not extend beyond the Indian region into China and Australia as they do.

751. *Catochrysops nicola*, Swinhoe.

C. nicola, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 132, n. 46.

HABITAT: Poona, December.

EXPANSE: ♀, 1.2 inches.

DESCRIPTION: "FEMALE. UPPERSIDE, both wings pale blue, with broad costal and outer black borders, deepest at the apex [of the forewing]. Hindwing with five marginal greyish black spots surrounded by yellowish commencing near the anal angle, one in each interspace, with whitish streaks above each spot. UNDERSIDE, both wings pale greyish, markings greyish-brown surrounded by white, a streak at the end of each cell, a whorl of discal square spots, a row of marginal and submarginal square spots, the submarginal spots having a white band internally. [Hindwing with] a subbasal centre spot and three others below it in a line, and two black spots on an orange ground near the anal angle."

"This is closely allied to *C. pandava*, Horsfield, and may probably be only a local form of that species." (Swinhoe, l. c.)

In the above description Colonel Swinhoe does not say how many specimens he possesses of this "new species," he does not figure it, and the male is undescribed. Nor does he say how it differs from *C. pandava*, but from the description the five black marginal spots surrounded by yellowish on the upperside of the hindwing seem to be distinctive. I do not quite follow the "subbasal centre spot and three others below it in a line" on the underside of the hindwing. In *C. pandava* there is a prominent black spot near the middle of the costa, and four subbasal spots arranged nearly in a straight line across the wing, the uppermost one close to the costa, the lowest on the abdominal margin, the two in the middle of the wing near together.

Genus 122.—TARUCUS, Moore. (PLATE XXVII).

Tarucus, Moore, Lep. Cey., vol. i, p. 81 (1881).

"FOREWING, triangular; costa very slightly arched at base, apex slightly acute, exterior margin oblique and slightly convex, posterior margin straight; costal nervure short, not extending to half length of the margin; first subcostal nervule short, emitted at one-half before the end of the discoidal cell, anastomosed to the costal nervure near its end; second subcostal at one-third, and third subcostal at one-sixth before the end of the cell, fourth subcostal at one-half from third and terminating at the apex, fifth subcostal [upper discoidal] from the end of the cell; disco-cellular nervules slightly waved, radial [lower discoidal] nervule from their middle; discoidal cell long, broad; second median nervule emitted at one-fifth before the end of the cell, first median at more than half before the end; submedian nervure straight. HINDWING, bluntly oval; exterior margin convex, anal angle acute; with a slender tail from the end of the first median nervule; costal nervure much arched at the base, extending to the apex; first subcostal nervule emitted at one-half before the end of the cell; disco-cellular nervules inwardly oblique, discoidal nervule from their middle; discoidal cell short, broad; second median nervule emitted immediately before the end of the cell; first median at one-half before the end; submedian nervure straight, internal nervure recurved. BODY slender; palpi perfect, second joint projecting about one-third beyond the head, clothed with long lax scales; third joint slender, naked; legs slender; antennæ with a very long slender grooved club. Eyes smooth in *T. theophrastus* and allies, hairy in *T. plinius* and *T. telicanus*. "Type, *T. theophrastus*, Fabricius." (Moore, l. c.)

In the forewing the costal nervure is short, not reaching opposite to the apex of the discoidal cell; the first subcostal nervule is suddenly bent upwards towards the costal nervure soon after its origin, and in the males touches the costal nervure (does not anastomose with it as Mr. Moore says), in the females there is a small portion of wing-membrane between these two veins; the second subcostal has its origin slightly nearer to the base of the first than to the base of the upper discoidal; the third subcostal has its origin rather nearer to the base of the upper discoidal than to the apex of the wing; in *T. theophrastus* the middle and lower disco-cellular nervules are in a straight line, upright, and of nearly equal length; in *T. plinius* the middle disco-cellular is slightly outwardly oblique, the lower upright. In the hindwing Mr. Moore says the first subcostal nervule is emitted at one-half before the end of the cell, in *T. theophrastus* it is given off at hardly one-third, and in *T. plinius* at about one-fourth before the end; in *T. theophrastus* the disco-cellular nervules taken together are nearly upright, the upper slightly outwardly, the lower slightly inwardly, oblique; in *T. plinius*

they are rather more in a straight line; the second median nervule is given off sometimes immediately before, sometimes at, and sometimes immediately after, the end of the cell.

I have described thus carefully all the differences I can discover in the structure of *T. theophrastus* and *T. plinius*, as Mr. W. Doherty, whose opinion is entitled to respect, holds that the latter species should form the type of a genus distinct from *Tarucus*. The differences, however, are so slight that I follow Mr. Moore in placing them both in one genus.

I have fully described the transformations of *T. theophrastus*, Fabricius, as observed in Calcutta, when describing that species.

Tarucus is a widely-distributed genus, occurring in Europe, North, West, and South Africa, Western Asia, Asia Minor, Persia, India, Ceylon, but not in the Andaman or Nicobar Isles, or the Malay Peninsula; one species, *T. plinius*, occurs in Western Africa, Aden, almost throughout India, Ceylon, Burma, Java, and in China. Two species occur in Europe. *T. balcanica*, Freyer, is found in Turkey, also in Western Asia and Persia, and is perhaps only a local race of *T. theophrastus*; the other, *T. telicanns*, Lang, in South Europe, North Africa, and Western Asia, and is allied to *T. plinius*. Omitting *T. plinius*, which is easily recognised, and belongs to a different group, six forms of *T. theophrastus* have been recorded from India, and are maintained as distinct species by Mr. Butler. I am able to recognise as satisfactorily distinct two only of these forms, *T. theophrastus* (which, however, Mr. Butler of late insists is not an Indian insect at all, but confined to North Africa and Aden, though in 1883 he recorded it from Mhow, but which I agree with most writers and observers in believing to occur everywhere almost in India and Ceylon), and *T. venosus*, which has as yet been found only in a corner of the Western Himalayas, in Kumaon, and in Malda. I can indeed separate and recognise specimens of all the other described forms, but I find by a careful study of my long series of specimens of this genus from all parts of India, that the characters given as representing specific differences are infinitely variable: they grade off one into another, and are quite unreliable. However, for facility of further study, I have given the descriptions of all these so-called species separately, and placed in the Habitat headings only those localities for each species which have been recorded by others.

Key to the Indian species of *Tarucus*.

- A. Underside, forewing streaked and spotted, markings not arranged in alternate broad and narrow bands at right angles to costa.
- a. Male, upperside, both wings with narrow black border to outer margin.
 752. *T. THEOPHRASTUS*, North Africa, Aden.
 753. *T. NARA*, Karachi, Western Himalayas, Punjab, Bombay, Deccan, Central India.
 754. *T. CALLINARA*, Upper Burma, various parts of India.
 755. *T. ALTERATUS*, Western Himalayas.
 756. *T. EXTRICATUS*, Karachi, Campbellpore, Landour.
 - b. Male, upperside, both wings with broad black border to outer margin.
 757. *T. VENOSUS*, Western Himalayas, Kumaon, Malda district.

B. Underside, forewing with markings arranged in alternate broad and narrow bands at right angles to costa.

 758. *T. PLINIUS*, Western Africa, Aden, India, Ceylon, Upper Burma, Java, China.

752. *Tarucus theophrastus*, Fabricius.

Hesperia theophrastus, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 281, n. 82 (1793); *Polyommatus theophrastus*, Godart, Enc. Méth., vol. ix, p. 658, n. 139 (1824); *Lycana theophrastus*, Lucas, Expl. Alg., Zool., vol. iii, p. 362, n. 47, Léop. pl. 1, figs. 6, 6a, male; 6b, antenna (1849); id., Horsfield, Cat. Lep. E. I. C., p. 73, n. 8 (1848); id., Horsfield and Moore, Cat. Lep. Mus. E. I. C., vol. 1, p. 25, n. 22 (1857); id., Trimen, Rhop. Afr. Aust., p. 241, n. 142 (1866); id., Moore, Proc. Zool. Soc. Lond., 1865, p. 772; id., Lang, Butt. of Eur., p. 140 (1884); *Lampides theophrastus*, Butler, Cat. Fat. Lep. B. M., p. 164, n. 9 (1869); *Tarucus theophrastus*, Moore, Lep. Cey., vol. 1, p. 81, pl. xxxvi, fig. 3 (1881); id., Butler, Proc. Zool. Soc. Lond., 1883, p. 148, n. 13; idem, id., l. c., 1884, p. 484, n. 13; id., Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 134, n. 71; idem, id., l. c., 1886, p. 428, n. 55; id., Doherty, Journ. A. S. B., vol. iv, pt. 2, pp. 112, 132, n. 159 (1886); *L. prittacus*, Allard, Ann. S. Fr., 1867, p. 313.

* *L. theophrastus* is not included in Mr. Trimen's "South-African Butterflies," so probably the species was formerly incorrectly given as from South-Africa in the British Museum collection.

HABITAT: Morocco (*Leaortius*), Barbary and Egypt (*Gottardi*), Algeria (*Lucas* and *Langi*), India, North India, Canara (*Horsfield* and *Moore*); Bengal, Ceylon (*Moore*); West Africa, Aden, Mhow (*Butler*); North Sind, Sukkur, Shikarpore; Poona, September, November, and January; Bombay, October; Mhow, September to July (*Swinhoe*); Haldwani, at the foot of the Kumaon Hills (*Doherty*).

EXPANSE: ♂, ♀, ♀ to 1.7 inches.

DESCRIPTION: MALE. **UPPERSIDE,** *both wings* shining bluish-purple, with a narrow outer dull black margin, the *cilia* whitish. *Forewing* with a somewhat large and long rounded or ovate black disco-cellular spot. *Hindwing* with a round black spot on the margin in the first median interspace, and a longitudinal one at the anal angle, the outer narrow black border inwardly defined at this part (sometimes throughout) with a fine white marginal thread; *tail* black, tipped with white. **UNDERSIDE,** *both wings* greyish-white (sometimes with a faint ochreous tinge). *Forewing* with the following markings, all deep brown, sometimes of a more or less rusty tint, *viz* :—a lengthened longitudinal subcostal streak from the base of the wing, joining the costa at about one-third of the length of the wing and continued along it; an oblique subbasal or ante-discal wedge-shaped streak with its apex on the subcostal extending to the submedian nervure, sometimes divided in the middle into two portions; beyond this is a transverse discal striga from the first subcostal nervule to the submedian nervure, sometimes continuous though slightly dislocated, sometimes in two distinct portions, its lower portion shifted somewhat outwardly; beyond this on the anterior portion of the disc are three large spots forming a triangle, the upper spot is sometimes round, sometimes lengthened, the middle spot is rounded, the lower spot lengthened and placed at right angles to the upper spot and sometimes coalescing with the lower portion of the discal striga; beyond these spots is a regular series of spots sometimes well-separated, sometimes joined together into a band, its anterior portion curved towards the base of the wing before it reaches the costa; a submarginal series of six rounded regular well-separated spots, and an anteciliary black line. *Hindwing* with a crescent-shaped black basal band from the costal nervule to the abdominal margin, sometimes divided into a long anterior portion and a well-separated spot on the abdominal margin; a subbasal transverse series of four black spots crossing the wing, sometimes joined into a continuous straight band, sometimes arranged in a straight line, sometimes placed in echelon; an irregular discal series of six spots arranged in pairs; three spots beyond in the middle of the disc; a regularly-curved band beyond, sometimes divided into eight well-separated spots; a marginal series of seven round spots, the four lower ones being black and profusely sprinkled with metallic-greenish scales; a fine anteciliary line. **FEMALE.** **UPPERSIDE,** *both wings* blackish, sprinkled with metallic bluish-purple scales towards the base. *Forewing* with all the black markings of the underside more or less showing through by transparency, some whitish spots on the disc. *Hindwing* with a discal series of short white streaks between the veins; a marginal series of black spots between the veins inwardly defined by white lunules; a fine white, then a fine black marginal thread. **UNDERSIDE,** *both wings* as in the male.

I have drawn up the above description from three male and a female specimen from Algeria in the collection of the Indian Museum, Calcutta, these specimens representing the typical form of the species. It will be noted that these four specimens differ a good deal *inter se*, a large series would probably present many more differences.

Mr. Mucre describes the Ceylon form as follows :—" **MALE.** **UPPERSIDE,** *both wings* lavender-blue, costal edge and exterior margins narrowly lined with black. *Forewing* with an indistinct black disco-cellular spot. *Hindwing* with a less distinct subanal spot; *tail* black, tipped with white. *Cilia* white, with inner black border. **UNDERSIDE,** *both wings* greyish-white. *Forewing* with a black straight streak below the costal nervure, an oblique subbasal streak, two transverse discal streaks, three subapical spots, and two marginal rows of quadrate spots. *Hindwing* with a transverse basal and subbasal black streak, irregularly disposed discal spots, a submarginal broken row of lunular spots, and a marginal row of slightly larger rounded

spots, the outer series speckled with metallic green scales. FEMALE. UPPERSIDE, both wings with blue basal and white discal areas, the discal areas black-spotted, the outer borders black and traversed by a more or less distinct row of slender white lunular marks which are single on the forewing and double and broadest on the hindwing." UNDERSIDE, both wings as in the male.

"Note.—The markings on the underside of this species are wider and more broken up than in the allied North Indian form (*T. nara*,* Kollar), and the female is more prominently white-marked on the upperside." (Moore, l. c. in Lep. Cey.)

Fabricius in establishing the species in 1793, described only the female; but Godart in the *Encyclopédie* in 1823 described also the male. Dr. Horsfield in 1828 redescribed both sexes; but the India House Museum contained only one female specimen from the Mediterranean coast, this species not having been taken in Java by Dr. Horsfield. The term used by him for the colour of the underside macular streaks is 'ater': while he distinguishes the penultimate spot of the marginal series of the hindwing as 'niger'—and 'pronounced black.'

"M. Lucas' figure is not very characteristic. The species may readily be distinguished from *T. nara*,* Kollar, of India by the break in the submarginal series of spots on the underside of the hindwing, the spots towards the costa forming a line with those beyond the cell." (Butler, l. c. in Proc. Zool. Soc. Lond., 1864). I find this character to hold good in a single female specimen from Aden (Mr Butler is writing about Aden butterflies) in my collection, but it does not exist in the four typical Algerian specimens I have described above. As I cannot find this character represented in any Indian specimen, and it does not occur (in some at any rate) North African examples, Mr. Butler may hereafter, perhaps, consider it a sufficient character on which to found a "new species."

EGG, pale apple-green with porcelain-white ridges and tubercles, the ridges arranged in lines parallel to or concentric with the equator, the tubercles arranged meridionally in curved lines, so that the tubercles, when the egg is viewed from above, form a figure like a star of many rays all curved similarly and in the same direction. The tubercles appear very conspicuous under a microscope and are blunt conical, in size they are equal in diameter about to the intervals between them. The egg is very much flattened, and with a wide depression at its apex, it has in fact much the proportions of an Echinoid of the genus *Diadema*. The character of the sculpturing of this egg, as compared with that of *Curetis thelys*, Drury, is quite different. LARVA, just half an inch in length when full-grown, much flattened, the head pale ochreous and completely hidden under the second segment, which is somewhat wide, the third and fourth segments progressively a little wider, whence the body very gradually tapers to the last segment, which is about as wide as the second. Colour pale green, the whole upper surface covered with a shagreening of small white tubercles, which under a magnifying glass give it a frosted appearance; along the lateral edge of the body and round the anal segment there are numerous somewhat long whitish hairs. From the third to the anal segment there is a somewhat broad (slightly decreasing in width posteriorly) yellowish-green dorsal stripe, which bears a red stripe in its middle decreasingly on the first four segments on which it appears; in some specimens the dorsal stripe is marked with reddish on both sides, which colour is very conspicuous on the twelfth and thirteenth segments. There is also a subdorsal series of small spots from the third to the eleventh segments inclusive, which are quite inconspicuous in some specimens. The extensile organs on the twelfth segment are small. The constrictions between the segments slight and inconspicuous. Dr. Lang says it feeds on "*Lisaphus* [?] *Zinyphus* *vulgaris*." In India it eats the young leaves and flower buds of *Zinyphus jujuba*. Dr. A. Forel of Geneva identifies the ants which attend these larvæ as "*Camponotus rubripes*, Drury (*sylvaticus*, Fabricius), subspecies *compressus*, Fabricius; and *Phedole latimoda*, Roger." PUPA, of the usual lycenid shape; head, thorax, and wing-cases green speckled thickly with black, abdomen green. There is an indistinct

* How either Mr. Moore or Mr. Butler can have ascertained that the underside spots and markings of Kollar's *T. nara* were wide or narrow, continuous or macular, I am at a loss to understand, seeing that Kollar's Latin and German descriptions give absolutely no information whatever on these points.

blackish dorsal line extending down the whole length of the body, with a double subdorsal series of indistinct black specks; the head is rounded, the thorax slightly humped, the pupa throughout quite smooth.

Mrs. Wyllie has sent me a very interesting note on the behaviour of the "large common black ants of Indian gardens and houses" to the larva of *T. theophrastus*. In this account, after describing the special organs possessed by these larvæ, she relates the way the ants attend the caterpillars till they are full-grown, when the ants drive them down the stem of the tree which they have hitherto inhabited into a temporary nest the ants have set up at the foot of the tree, where on opening the nest "you will see some hundreds of larvæ and pupæ in all stages of development arranged in a broad and even band all round the trunk, and lightly covered with earth." The perfect insects emerge in this nest, and after drying their wings are allowed to fly away unmolested.

I have only to add that it seems highly improbable to me that a species which is obviously so variable, and whose variations are not confined to well-defined regions, can be split up into numerous distinct species as Mr. Butler evidently thinks it can. The full number of these so-called new species has not apparently been reached, as Mr. Butler says that Colonel Swinhoe's specimens "represent two or more new species," of which he describes one.* The certain proof of the identity of several forms in one species is, however, to be found only in breeding the species from the egg at all seasons of the year throughout the country; and entomologists who would make a serious attempt to solve this question should experiment in this direction, and, as the species is wide-spread and its food plant (*Zizyphus*) is also easily accessible, they should have no difficulty in doing so.

753. *Tarucus nara*, Kollar

Lycena nara, Kollar, Hügel's Kaschmir, vol. iv, pt. 2, p. 421, n. 6 (1848); *Tarucus nara*, Butler, Proc. Zool. Soc. Lond., 1881, p. 506, n. 20; idem, id., 1886, p. 366, n. 42; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 47 (1888); id., Moore, Proc. Zool. Soc. Lond., 1882, p. 245; id., Swinhoe, l. c., 1884, p. 506, n. 22; idem, id., 1885, p. 134, n. 70; idem, id., 1886, p. 427, n. 54.

HABITAT: Masuri (Kollar); Campbellpore, Punjab; Karachi, May and October (Butler); N.-W. Himalayas (Moore); Karachi, appears in great plenty at latter end of April and lasts until about the middle of August; Poona, October, December, January, April, and May; Bombay, July to December; Ahmednuggur, August and September; Mhow, September to July (Swinhoe).

EXPANSE: ♂, ♀, '95 of an inch (Kollar).

DESCRIPTION: "MALE. UPPERSIDE, both wings shining with violet, with a median black dot. UNDERSIDE, both wings white spotted with black. Hindwing with marginal dots sprinkled with greenish-golden. FEMALE. UPPERSIDE, both wings somewhat fuscous spotted with white, powdered with bluish." UNDERSIDE, both wings as in the male.

"Nearly allied to *Lycena* [*Catalus*] *rosimon*, Fabricius, especially on the underside. On the UPPERSIDE (of the male), violet-blue with a longish black spot in the middle of each forewing, and a narrow border of the same colour on both wings. On the UNDERSIDE of the wings white: the forewing with a black streak ascending obliquely from the base towards the costal margin: but all the wings with several black spots which are grouped in a band-like manner. Four (and sometimes five) of these spots in the outermost row on the hindwing are thickly beset with golden green scales. The female differs from the male in being of a dirty brown colour on the upperside of the wings on which the white colour of the underside shows through in a spotty manner, and a few blue scales are visible at the base of the wings. Whether the hindwing was furnished with a slender tail cannot be found out, as the two specimens which we possess are somewhat damaged. The abdomen is brown on the back and alternately white and brown on the sides: but beneath it is white. The antennæ brown with white rings." (Kollar, l. c.)

It will be observed that Kollar's descriptions (taken from only two injured specimens brought by Baron Von Hügel from Masuri) are not sufficiently precise to enable any one who has never seen

these two types to institute any comparisons, in respect to the size and distribution of the spots, between Kollar's *nara* and other forms of the variable *theophrastus*. The description, such as it is, suits *theophrastus* generally, and all that can be really decided is that the types represented a *theophrastus* (?) of $1\frac{1}{2}$ lines in expanse, and of a decidedly white undersurface with black spots. The terms used by Kollar, who is precise in definition, both in his Latin and German descriptions, for the colours of the underside, are distinctly black and white, not blackish, or fuscous or brown or whitish: so far he is precise: but the size and the exact arrangement of these spots is not in the slightest degree indicated, beyond the fact that they were arranged 'band fashion.' The basal streak, however, on the forewing, so characteristic of *T. theophrastus*, is clearly described, as are also the four or five golden green bespcked spots on the exterior margin of the hindwing below; so that we may safely assume that *T. theophrastus* or a form of that species is here described; but that is all. But when writers of the present day proceed to compare the size and arrangement of the spots of their newly-named species with those of Kollar's *T. nara*, they must evolve from their inner consciousness alone some imaginary *T. nara* with which to effect the comparison.

In the Indian Museum, Calcutta, are three males, two from Kalka in the Punjab and one from Bholahât in the Malda district, which have been named *T. nara* by Mr. Moore. But these specimens agree (in the arrangement though not in colour of the spots below) exactly with Mr. Butler's description of *T. callinara*, and I do not know the basis of Mr. Moore's identifications of these particular specimens with the very meagrely described *T. nara* of Kollar; in fact, it may be certainly affirmed that to whatever form of *T. theophrastus* these three specimens pertain it is *not* to the black-spotted *T. nara*, as their spots below are all ferruginous-brown. The fact is there is nothing to distinguish *T. nara* as described by Kollar from *T. theophrastus* as described by Horsfield.

Colonel A. M. Long, R. E., reports that in Kumaon he has found this species very uncommon; but at 5,500 feet altitude near Naini Tal he has taken in June specimens clear white below with the markings black or nearly so, and thus coinciding with the description, as far as it goes, of Kollar's N.-W. Himalayan insect *T. nara*.

754. *Tarucus callinara*, Butler.

T. callinara, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 185, n. 24 (1886); Idem, id., l. c., sixth series, vol. i, p. 147, n. 46 (1888).

HABITAT: Sheemagar, Upper Burma, December; Hunipur, N.-W. India, 13th October, 1886; various parts of India (Butler).

EXPANSION: '95 of an inch.

DESCRIPTION: "Near to *T. nara*, Kollar, with which both sexes agree on the upperside; on the underside, however, they agree with *T. venosus*, Moore, the black markings being all much enlarged; the submarginal lunules separate, instead of in a continuous dentate-sinuate line; the series of spots beyond the cell of the hindwing quite distinctly arranged, commencing with three spots in a regular oblique series, the third of these forming the first of three spots arranged in a triangle, and beyond these two spots placed angle to angle, the lower one contiguous with the subbasal series."

"The preceding appears to be a widely-distributed species, occurring in various parts of India and flying in May, July, August, September, and December. We have received it in all Colonel Swinhoe's collections under the name of *T. theophrastus*, Fabricius, an African species, differing considerably from it in the arrangement of the markings on the underside of the hindwing." (Butler, l. c.)

The arrangement of the spots on the underside of the hindwing agrees exactly with that of some specimens which have been named for the Indian Museum, Calcutta, by Mr. Moore, as *T. nara*, Kollar, but which (as I have above shown) cannot be referred to that particular form of *T. theophrastus*. In *T. venosus*, Moore, also, the submarginal lunules on the underside of both wings are often separated into distinct spots, and I know of no single character by which *T. callinara* can be distinguished. It is said to have its underside markings different from

those of Kollar's *nara* in certain particulars; but as Kollar never described the arrangement of the markings of his species, there is no basis whatever on which to found a comparison and to note the deviations, as Mr. Butler has attempted to do.

This form, however it may be defined, falls under the general description of *T. theophrastus*, given above. It has no pretensions to be a geographical variety, as it occurs in localities so far apart and so diverse in physical aspects as Burma and N.-W. India; and it is stated by Mr. Butler to have a wide distribution in many parts of India.

755. *Tarucus alteratus*, Moore.

T. alteratus, Moore, Proc. Zool. Soc. Lond., 1882, p. 245, pl. xli, figs. 4, 4a, male.

HABITAT: Dharmasala, N.-W. Himalayas.

EXPANSE: '83 of an inch.

DESCRIPTION: "Allied to *T. nara*, Kollar, but smaller. UPPERSIDE, both wings, colour paler, and of a more decided bluetint than in *T. nara*. Forewing with a slender disco-cellular dusky lunule. Hindwing with a small dusky spot above the tail, and a slender marginal white line. UNDERSIDE, both wings dull pale greyish-ochreous, with similarly disposed markings as in *T. nara*, which are, however, more slender, paler, and much less distinct, those on the hindwing being reddish-ochreous, the marginal metallic spots more or less golden. Cilia brownish-white." (Moore, l. c.)

The distinguishing feature of this species is the ochreous colour of the ground on the underside, and the attenuated markings of a reddish colour. From the description, some specimens of *T. extricatus*, Butler, have the markings on the underside much the same colour (rust-red), but that species is said to have the markings below as in *T. theophrastus*, Fabricius, while *T. alteratus* has them as in *T. nara*. But as explained above, no one can state in the slightest degree what was the arrangement of the markings of Kollar's *T. nara*. Of all forms of *T. theophrastus* this is the furthest removed from *T. nara*, which, whatever other characters it may have had, was an insect with a white underside and black markings: this form has a pale ochreous-grey underside with very slender and pale reddish-ochreous markings. It is in fact the best-marked form of *T. theophrastus* which has yet received a name, and is the most likely of them to be established as a separate species, should this be the case with any of these forms.

Colonel Lang reports that is a common form in the Punjab in the winter, affecting arid ground and especially avenues or plantations of *Acacia arabica*, on which he used to think the larva fed: he never however found the larva. It may be the dry-season form in those localities of some darker-coloured wet-season form of *T. theophrastus*. I possess typical specimens from Kattuwar, Kulu, and from Bholahât in the Malda district.

756. *Tarucus extricatus*, Butler.

T. extricatus, Butler, Proc. Zool. Soc. Lond., 1886, p. 366, n. 43, pl. xxxv, fig. 2, male; idem, id., Ann. and Mag. of Nat. Hist., sixth series, vol. i, p. 147, n. 45 (1888).

HABITAT: Karachi, Campbellpore, Landour.

EXPANSE: ♂, '6 to '10; ♀, '11 to '12 inches.

DESCRIPTION: "Paler than *T. nara*, Kollar, on the UPPERSIDE; varying in size even more than *T. balkanica*, Freyer. UNDERSIDE readily distinguished by the much greater regularity of the markings, those of the forewing being arranged nearly as in *T. theophrastus*, Fabricius (i. e., the medial stripe [on the forewing] is often unbroken, the subcostal spot beyond sometimes confluent with it so as to form a Γ-shaped marking; the dashes beyond the medial stripe placed transversely and always confluent instead of forming an interrupted <-shaped character); the markings of the hindwing vary in colour from rust-red to black, but correspond in character with those of *T. nara*." (Butler, l. c.)

"Taken in Karachi in May, October, and December, 1885, and in January and April, 1886." (Swinhoe).

T. extricatus, as above defined, appears to be an insect varying from '6" to '12" in expanse, of a pale violet tint, having the medial striga of the forewing below often unbroken (as this

however is admittedly not constant, the character is of no value); the subcostal spot *sometimes* [only] confluent with it (again an inconstant, valueless character): the dashes beyond the medial striga confluent (but this is the case in very many specimens of *T. theophrastus*): the hindwing markings varying from rust-red to black (thus no character is established in respect to this particular): they correspond in character with those of Kollar's *T. nara*, (which are entirely unknown). If the above be critically considered, it will be found that not one single character remains by which to distinguish *T. extricatus*. The colourless, characterless, description will suit *T. theophrastus* in any of its forms. In the 'rust-red' markings of some specimens of the form there is agreement with *T. alteratus*, but that form has a deeper blue upper surface in the male, while this form is of a pale violet tint, which, however, it shares with many ordinary *T. theophrastus*.

In the above description Mr. Butler defines the supposed differences between *T. extricatus* and his conception of Kollar's *T. nara*, but he gives little indication how the former is supposed to differ from *T. theophrastus*. The specimen Mr. Butler figured must be abnormally small, as he speaks afterwards of obtaining another male specimen from Campbellpore "about twice the size of my type, or about as large as the smaller examples of *T. nara*."

757. **TARUCUS VENOSUS**, Moore. (PLATE XXVII, FIG. 189 ♂).

T. venosus, Moore, Proc. Zool. Soc. Lond., 1882, p. 245, pl. xii, figs. 6, 6a, male; id., Doherty, Journ. A. S. B., vol. 17, pt. 2, p. 134, n. 160 (1886). id., Butler, Ann. and Mag. of Nat. Hist., sixth series, vol. 1, p. 147, n. 48 (1888).

HABITAT: Dharmasala; Kulu Valley; Kala Pani, N.-W. India, 30th August, 1886; Bagheswar, Sarju Valley, common, also in the Kali Valley, 2-4,000 feet, Kumaon; Malda district.

EXPANSER: ♂, ♀, 1.0 to 1.3 inches.

DESCRIPTION: "Allied to *T. theophrastus*, Fabricius, and to *T. nara*, Kollar. Wings larger and broader, forewing less triangular, the exterior margin more convex. UPPERSIDE, *both wings* duller blue than in *T. theophrastus* and *T. nara*, and of a slight violaceous tinge, with a broad marginal dusky border, similar to that in the male [? female] of *Zizya chandala* [= *Z. maha*, Kollar], veins dark-lined. Forewing with a broad dusky spot [in the cell]. Hindwing with a slender lunule at the end of the cell, and a slender white marginal line above the tail. UNDERSIDE similar to the above-quoted species, all the markings, however, being broader in both sexes. FEMALE. UPPERSIDE, *both wings* entirely violet-brown, with the exception of a very few blue scales sparsely disposed on the basal area. Forewing with an indistinct darker cell-spot. Hindwing with a spot above the tail. UNDERSIDE as in the male. *Cilia* whitish." (Moore, l. c.)

I believe *T. venosus* to be a distinct species, though breeding may prove it to be a dark form of *T. theophrastus* only, occurring in the rains. It is the largest species of the genus, has a very broad outer black margin on the upperside of both wings, the markings below large and prominent. The number of the black spots on the upperside of the forewing in the male varies considerably five being the common number. I took a considerable series of it in the Kulu Valley, in July, the specimens hovering round and settling on a *Zizyphus* bush, on which the larva doubtless feeds. Mr. A. Grahame Young has also taken it in Kulu in August. As typical *T. nara* and *T. alteratus* occur also in the same spot, it is by no means improbable that they are all one species, *T. alteratus* being the spring broad, *T. venosus* the rains' brood, and *T. nara* appearing just before or just after the rains. Major J. W. Verbury reports that *T. venosus* occurs commonly at Campbellpore almost all the year round, also that he gets it commonly on the lower slopes at Murree and Thundiani in August and September. The former statement requires verification; it is most desirable that accurate observations should be made as to the exact times of appearance of this species. My own belief is that it occurs only in the rains. Mr. W. H. Irvine has sent me a single male taken at Bholahat in the Malda district, which I am unable to separate from this species.

The figure shows both sides of a male specimen from Kulu in the Indian Museum, Calcutta.

758. *Tarucus plinius*, Fabricius.

Herpilia plinius, Fabricius, Ent. Syst., vol. iii, pt. 1, p. 284, n. 92 (1793); *Papilio plinius*, Donovan, Ins. Ind., pl. xlv, fig. 1 (1800); *Polyommatus plinius*, Godart, Enc. Méth., vol. ix, p. 658 n. 140 (1803); *Lycena plinius*, Horsfield, Cat. Lep. E. I. C., p. 72, n. 7 (1828); *Tarucus plinius*, Moore, Lep. Cey., vol. i, p. 82, pl. xxxvi, fig. 4 (1881); id., Swinhoe, Proc. Zool. Soc. Lond., 1884, p. 506, n. 23; idem, id., l. c., 1885, p. 133, n. 69; idem, id., l. c., 1886, p. 427, n. 53; *Lampides cassius*, Cramer, var. *plinius*, Butler, Cat. Fab. Lep. B. M., p. 164, n. 6 (1869); — *plinius*, Doherty, Journ. A. S. B., vol. iv, pt. 2, p. 132, n. 161 (1886); *Lycena pulchra*, Murray, Trans. Ent. Soc. Lond., 1874, p. 524, pl. x, figs. 7, male; 8, female; *Tarucus pulcher*, Butler, Proc. Zool. Soc. Lond., 1884, p. 483, n. 12.

HABITAT: West Africa (*Murray*), Aden (*Butler*), Karachi, N.-W. Himalayas, Kumaon, almost everywhere in the plains of India, Ceylon, Upper Burma, Java, Formosa.

EXPANSE: ♂, ♀, 1'0 to 1'2 inches.

DESCRIPTION: "MALE. UPPERSIDE, *both wings* pale violet-blue, with a purple reflexion, surrounded by a very delicate brown border fringed with white. UNDERSIDE, *both wings* white and variegated with oblique transverse or semi-transverse bands irregularly sinuated at their edges, oblong or tapering, of unequal breadth, and arranged in the following succession:—*Forewing*, at the base a broad longitudinal band extends with a slight obliquity to the middle of the costa; between this and the interior margin is a triangular mark; and before [beyond] this a transverse mark gradually attenuated towards the costa; an obscure evanescent band next extends from the exterior margin to the disc; and immediately exterior to this, a prominent band gradually increasing in breadth and terminated by a short point, passes over the disc; the band next in order is short, and near its termination a nearly circular or oblong spot is placed; two obliquely transverse bands now extend from the costa half across the wing, the first being oblong, the other attenuated or pyramidal; the posterior margin is bounded by two regularly-continued strigæ, the anterior of which is broader and slightly waving, enclosing a series of oblong marks. *Hindwing* with these latter continued uniformly to the anal region, where the two last are of a deep black tint, with a yellowish iris, and covered with greenish resplendent irrorations; to the last a very minute black spot at the extreme anal angle is applied; the marginal spot in the anterior apical angle is more pronounced than the rest; the disc and base are variegated with very irregular oblong marks, with sinuated margins, transversely arranged, the posterior one being most conspicuous and decorated with acute radiant points directed to the margin. *Tail* very slender and grayish at the base [tip]. *Antennæ* and *abdomen* banded. FEMALE. UPPERSIDE, *both wings* greatly resembles *Lycena* [*Castalius*] *rosimon*, Fabricius; the surfaces covered with transverse patches, and the blue tint, which is purely azure, is confined to the base. UNDERSIDE, *both wings* agree with the male in the disposition of the marks, but the surface is whiter, the bands are more intensely coloured, and their edges are more regularly defined. The radiated band in the *hindwing* is less distinct than in the male, but the marks generally are more pronounced." (*Horsfield*, l. c.)

"The structure of the costal and subcostal nervures of the forewing shows that this species does not belong to Mr. Moore's genus *Tarucus*." (*Doherty*, l. c.)

"*T. plinius* is not so common as *T. theophrastus*, Fabricius, but not rare, coming out at the same season. I have found the larva on *Sesbania aculeata*, an annual which springs up everywhere in Bombay during the rains, and shoots up to a height of six or seven feet and withers away in October. Its fragile leaves wither up a few minutes after being plucked, and it is no easy matter to rear a minute larva on them. I was successful with only one. I find it described in my notes as green and of the usual wood-louse form, with a dorsal ridge of small protuberances. The pupa, [from] which [the butterfly] came out in seven days, was greenish, smooth, not a quarter of an inch long, and closely attached to the bottom of the pill-box in which it was kept." (*Aitken*, Journ. Bombay Nat. Hist. Soc., vol. i, p. 217, n. 57 (1886).

I possess a note from an unknown correspondent that the larva of *T. plinius* feeds on plumbago. Colonel Lang also writes, "Almora, 5,500 feet, local. Numerous about hedges of *Plumbago capensis*."

Mr. E. E. Green has sent me drawings of the transformations of this species, and writes: "Egg flattish, apex concave. Larva pale greenish-yellow above, sides lilacine, a narrow brownish median line followed by eight diagonal short streaks and six brownish red spots. Before pupating the colouring becomes much more diffused. Feeds amongst the flower buds of Plumbago. Pupa dull yellowish, profusely mottled with brown spots. I have never observed ants attending this larva."

T. plinius is a common and wide-spread species, occurring in Western Africa, at Aden, throughout India, Ceylon and Burma, but not in the Malay Peninsula, reappearing however in Java and Formosa. It is extremely pugnacious, fighting with others of its own species whenever it meets them, and ascending high into the air during the contest. It settles chiefly on bushes or trees, seldom on the ground. Having seen specimens of "*Lycana*" *pulchra*, Murray, from Aden, in Colonel Swinhoe's collection identified by Mr. Butler, I have no hesitation in sinking that species as a synonym of *T. plinius*, with which, moreover, the description and figures entirely agree.

Genus 123.—CASTALIUS, Hubner. (FRONTISPIECE).

Castalius, Hubner *Verz. bek. Schmett.*, p. 70 (1816), id., *Moore, Lep. Cey.*, vol. 1, p. 58 (1881); id., *Distant, Rhop. Malay.*, p. 214 (1884).

"FOREWING, triangular, *costa* arched at the base, *apex* pointed, *exterior margin* oblique and slightly convex, *costal nervure* extending to a little over half length of the margin; *first subcostal nervule* very short, anastomosed to the costal nervure for a short distance near its end, emitted at nearly one-half before the end of the discoidal cell, *second subcostal* at a very short distance before [beyond] the base of the first; *third subcostal* at one eighth before the end of the cell; *fourth subcostal* at one-half beyond the cell; *fifth subcostal* [upper discoidal] from the end of the cell; *disco cellular nervules* slightly oblique and recurved, *radial* [lower discoidal] nervule from their middle, *discoidal cell* extending to more than half length of the wing, *second median nervule* emitted at one eighth before the end of the cell, *first median* at one half before its end, *submedian nervure* nearly straight. HINDWING, bluntly oval; *exterior margin* convex anteriorly, slightly angled, and with a delicate *tail* at the end of the first median nervule; *costal nervure* arched at the base and extending to the apex; *first subcostal nervule* emitted at one-fourth, before the end of the cell; *disco-cellular nervules* recurved, *radial* [discoidal] nervule from their middle; *discoidal cell* short, broad; *third* and *second median nervules* from the end of the cell, *first median* at one-third before its end; *submedian nervure* straight, *internal nervure* recurved. BODY small, *abdomen* short, *palpi* porrect, long, second joint compressed, clothed with compact hair scales, projecting half its length beyond the head, third joint slender, naked, more than half the length of the second; *legs* slender; *antennae* with a blunt spatular club. Type, *C. rosamon*, Fabricius." (*Moore*, l c.)

On examination of the neurulation of a bleached male and female of the type species taken in Calcutta, I find that in the forewing the costal nervure terminates on the margin about opposite to the end of the cell; the first subcostal nervule in the male for a short distance lies close to but is distinctly separated from the costal nervure, but in the female that it lies alongside of and touches, but is not anastomosed with, that vein; the base of the second subcostal is much nearer to that of the first than to that of the upper discoidal; the third subcostal is rather short, and is emitted nearer to the apex of the wing than of the cell; the disco-cellular nervules are nearly upright, slightly convex, the lower rather longer than the middle. In the hindwing the disco-cellulars are nearly in one straight line and upright, the second median nervule originating just before the lower end of the cell. The female differs from the male in having the wings rather broader, the apex of the forewing less acute, the outer margin more convex. The eyes are hairy.

There is more diversity in the coloration and markings in the species of this genus than is usual amongst *Lycanida* of this group, but all are well-distinguished by a white or pale yellow underside heavily marked with large black spots and blotches. On the upperside *C. rosimon* in both sexes has some metallic blue at the base of the wings only; this is characteristic also of the female of *C. ananda*, of which species, however, the male is deep shining purple on the upperside, in this respect being unique in the genus. *C. ethon* and *C. airavati* have the male brilliant metallic pale blue on the upperside with a white discal band to both sexes, the females lacking the blue coloration altogether. All the other species are without blue in either sex, but are easily distinguished by the disposition and shape of the black markings on the underside. Most of the species are common where they occur, and many of them have a wide range. Their flight is rapid, but never sustained for long distances. They almost always settle on the ground or on low plants, seldom or never on high bushes or trees. The males of *C. elna* and *C. decidia* in Sikkim are very common on damp spots by the sides of streams sucking up the moisture. In three species, *C. rosimon*, *C. elna*, and *C. decidia*, seasonal dimorphism occurs to a very great extent; this takes the usual form of melanism in the rains and albinism in the dry-season. In Ceylon, where the seasons are more equable, the extreme dry-season form of *C. didia* (*interruptus*) does not occur, though the intermediate form (*hamatus*) is met with. As regards the distribution of the genus, it occurs in Africa, throughout India, Ceylon, the Andaman and Nicobar Isles, Burma, and the Malay Peninsula and Archipelago. As the genus is used by but few authors, I am unable to give its exact distribution, or to indicate how many species are known to occur in it. The transformations of no species of the genus are known, as far as I am aware.

Key to the Indian species of *Castalius*.

- A. Both sexes, upperside, both wings, ground-colour white, marked with large black spots and an outer black margin; base of the wings metallic blue.
 - 759. *C. ROSIMON*, India, Ceylon, Andamans and Nicobars, Burma, Malay Peninsula, Siam, Malay Archipelago.
- B. Male, upperside, both wings, ground-colour deep shining purple, with narrow outer black margins. Female, upperside, ground-colour blackish, base of wings metallic blue.
 - 760. *C. ANANDA*, Sikkim, Assam, Orissa, South India.
- C. Both sexes, upperside, both wings, ground-colour black, with a discal white band.
 - a. Male, upperside, both wings with the base and disc glossed with metallic light blue. Female entirely black. Both sexes with two subbasal parallel black bands on underside of forewing.
 - a¹. Both sexes, upperside, both wings with discal white band wide; underside, both wings, markings small, hindwing with discal spots well-separated.
 - 761. *C. ETHON*, South India, Ceylon, Andamans, Assam, Burma, Malay Peninsula, Siam, Malay Archipelago.
 - b¹. Both sexes, upperside, both wings with discal white band narrow; underside, both wings, markings large, hindwing with discal spots connected, forming a band.
 - 762. *C. AIRAVATI*, Great Nicobar Island.
 - b. Male, upperside, both wings unglossed with blue.
 - a¹. Underside, forewing, with a single straight subbasal black band.
 - a². Underside, hindwing, base of costa white.
 - 763. *C. ROXUS*, Andamans, Burma, Malay Peninsula and Archipelago.
 - b². Underside, hindwing, base of costa black, black markings much broader than in *C. roxus*, discal white band on upperside narrower.
 - 764. *C. MANLUENA*, Nicobar Isles.
 - b¹. Underside, forewing, with a single elbowed subbasal black band.
 - 765. *C. ELNA*, Sikkim, Bhutan, Assam, Burma, Malay Peninsula, Java, Orissa, Andamans.
 - c¹. Underside, forewing, with a single elbowed subbasal black band as in *C. elna*, but in addition a basal longitudinal clavate black streak.
 - 766. *C. DECIDIA*, Bombay, Malda, Sikkim, Assam, Orissa, Ganjam, Nilgiris, Ceylon.

759. *Castalius rosimon*, Fabricius.

Papilio rosimon, Fabricius, Syst. Ent., p. 523, n. 341 (1775); idem, id., Sp. Ins., vol. II, p. 122, n. 541 (1781); idem, id., Mant. Ins., vol. II, p. 71, n. 672 (1787); id., Herbst, Pap., pl. cclxxix, figs. 5-7 (1800); *Hesperia rosimon*, Fabricius, Ent. Syst., vol. III, pt. 1, p. 288, n. 104 (1793); *Polyommatus rosimon*, Godart, Enc. Méth., vol. IX, p. 658, n. 141 (1823); *Lycana rosimon*, Horsfield, Cat. Lep. E. I. C., p. 71, n. 6 (1828); id., Snellen, Tijds. voor Ent., vol. XIX, p. 152, n. 41 (1876); *Cupido rosimon*, Druce, Proc. Zool. Soc. Lond., 1874, p. 106, n. 1; id., Snellen Tijds. voor Ent., vol. XXI, p. 17, n. 79 (1878); *Lampides rosimon*, Wood-Mason and de Nicéville, Journ. A. S. B., vol. I, pt. 2, p. 235, n. 41 (1881); *Castalius rosimon*, Hübner, Vers. bek. Schmett., p. 70, n. 697 (1816); id., Butler, Cat. Tab. Lep. B. M., p. 162, n. 1 (1869); id., Moore, Lep. Cey., vol. I, p. 83, pl. xxxvi, fig. 2 (1881); id., Distant, Rhop. Malay., p. 215, n. 1, pl. xxii, fig. 20, female (1884); *Papilio maimon*, Fabricius, Syst. Ent., p. 534, n. 395 (1775); idem, id., Sp. Ins., vol. II, p. 137, n. 635 (1781); idem, id., Mant. Ins., vol. II, p. 90, n. 817 (1787); *Hesperia maimon*, id., Ent. Syst., vol. III, pt. 1, p. 349, n. 327 (1793); *Papilio clyton*, Cramer, Pap. Ex., vol. I, pl. lxviii, figs. F, G (1775); *Castalius clyton*, Hübner, Vers. bek. Schmett., p. 70, n. 694 (1816); *Polyommatus clyton*, Godart, Enc. Méth., vol. IX, p. 679, n. 123 (1823); *Papilio coridon*, Cramer, Pap. Ex., vol. IV, pl. ccxli, figs. C-E (1781); *Castalius maurus*, Hübner, Vers. bek. Schmett., p. 70, n. 696 (1816); *Castalius chota*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 68; *C. approximatus*, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 186, n. 27 (1886).

HABITAT: Throughout India, except the desert tracts; the lower Himalayas, Ceylon, the Andaman and Nicobar Isles, Assam, Burma, Malay Peninsula, Siam, Java, Celebes, Timor.

EXPANSE: ♂, ♀, 9 to 14 inches.

DESCRIPTION: "MALE. UPSIDE, both wings white, with a grayish-blue base, over which a brilliant silvery irroration, varying according to the light, is thinly spread; anterior margin of both wings blackish-brown, a border of the same colour passing along the posterior margins, broader on the hindwing, indented at the inner edge, and bearing a regular series of white rings formed by crescents applied to each other, the exterior being in many cases so obscure, that merely a series of lunules directed outwards is apparent: a very irregular series of square or oblong macule passes along the inner edge of the marginal border, and several macule, more elongated, are scattered over the disc and along the anterior margin of both wings. UNDERSIDE, both wings white. Forewing, an oblique band of black extends from the base to the anterior margin, the interrupted macular fascia and the transverse marks of the disc and anterior margins appear more prominently on the underside; and parallel with the posterior margin extend three rows of small oblong spots, of which three, in the posterior series near the anal angle of the hindwing, are covered with a bluish-silvery irroration. Head, body, and abdomen, black above and white underneath, the latter bandled at the sides; antennæ with white annuli. FEMALE, larger than the male. UPSIDE, both wings with the posterior border broader, the black colour more intense." UNDERSIDE, both wings as in the male. (Horsfield, l. c.)

C. rosimon, like many other butterflies of this family, is subject to considerable seasonal dimorphism, specimens which are on the wing during the rains being much darker and more heavily marked than those occurring in the dry-season. Two of these dry-season forms have lately been described as distinct species as below.* It is probable that all localities which have two strongly-marked seasons, a wet and a dry, produce specimens to match these descriptions.

* *Castalius chota*, Swinhoe, Proc. Zool. Soc. Lond., 1885, p. 133, n. 68. HABITAT: Poona, February, May. EXPANSE: 7 to 9 of an inch. DESCRIPTION: "Smaller than typical *C. rosimon*, Fabricius. MALE and FEMALE UPSIDE, both wings with the marginal bands narrow, and the discal spots smaller. UNDERSIDE, both wings with the spot also much smaller. (Swinhoe, l. c.)

Castalius approximatus, Butler, Ann. and Mag. of Nat. Hist., fifth series, vol. xviii, p. 186, n. 27 (1886). HABITAT: Katha on the Irrawaddy, Upper Burma, January, Bombay. EXPANSE: 1.25 to 1.30 inches. DESCRIPTION: "Nearest to *C. chota*, Swinhoe, but running larger; it differs chiefly from *C. rosimon*, Fabricius, in the narrower borders to the wings and in the absence of the last of the discal black spots towards the external angle of the forewing, the other five spots being well separated, also in the absence of the black spot close to the border of the hindwing towards the apex, and in the indistinct and minute character of the marginal spots on the underside."

"We have a pair of this form taken in Bombay by Colonel Swinhoe. Whether it is a species or only a well marked variety nobody can definitely decide without breeding it; at any rate it is as distinct as the other named forms of the group." (Butler, l. c.)